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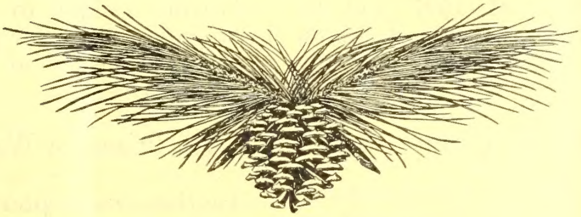

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Fire Loss Low in the Adirondacks and Catskills

Forest fire loss in the Adirondack and Catskill fire towns of New York was lower in the fire season of 1926 than in any other for which the State conservation commission has records. Of these areas totaling 7,270,000 acres only one-fiftieth of 1 per cent was burned over during the season. The average acreage per fire, likewise the smallest recorded, was 7 acres.

Pennsylvania Pushes Tree Planting

The State forest nurseries of Pennsylvania have 20,000,000 trees ready for distribution in 1927—twice as many as they have ever supplied in one year. On November 1, almost 9,000,000 of these had already been assigned. The 1,400 early applicants to whom they will go include residents of every county in the State, although the coal regions will take more than half.

In spite of the large early demand, members of the State forestry organization do not assume that they will find homes for all the 20,000,000 little orphan trees without special exertion. District Forester C. C. Hogeland, of Driftwood, has sent a personal letter to every school teacher and every permanent lessee of a camp site on the State forests in his district, reminding them that the trees are available and inclosing an application form. District Forester H. A. Smith, of Pottsville, is offering prizes of ornamental trees for school-ground planting to each school in Northumberland County that sends in applications for trees to plant 2 or more acres of idle forest land, and is also giving special prizes to schools that collect the greatest numbers of applications, that give the greatest assistance to landowners, and that get the largest contiguous areas planted. District Forester T. I. Shirey, of Johnstown, is working through his fire wardens. District Forester R. L. Emrick, of Scranton, has enlisted the cooperation of the press so successfully that he expects to double the orders of his district, which already call for 500,000 trees. District Forester V. M. Bearer, of Ligonier, every two weeks publishes in the newspapers the number of planters and the number of trees represented by the orders he has collected, and has already reported the granting of 509,450 trees to 87 planters.

Indiana Purchases Land for Forestry Purposes

The Indiana Department of Conservation has recently purchased about 12,000 acres of forest land in southern Indiana for forestry and game refuge purposes. In Brown County 11,000 acres of mountain land, at $10 an acre, has been purchased from the proceeds of fish and game licenses and placed under the supervision of the division of fish and game. About 5 acres of old fields included in this area will be reforest with coniferous seedlings supplied from the State t nursery. The Clark County State Forest, Henryvil is being enlarged by about 1,000 acres, including acres of virgin oak timber.

A new nursery site of 12 acres is being developed the Clark County State Forest, in an effort to me the rising demand for forest planting stock. T division of forestry hopes by 1929 to be producing million seedlings a year.

Vermont Fire Damage Reduced

Vermont was extremely fortunate in 1926 in rega to loss by forest fires. During the year there were fires, which burned over an area of 906 acres a caused damage amounting to approximately $3,46 The average annual area burned over in Vermont sin 1908 is 3,156 acres, therefore this year's loss is abo one-third of the average. The decrease was large due to the abundant precipitation during the f months and to the prompt action of the town fore fire wardens.

Another State Forest in Vermont

A gift of 206 acres of forest land has been receive by the State of Vermont from Miss Mary E. Waterma of Williamstown, Vt. The tract, which is to be know as the Ainsworth Forest Park, lies in the town Williamstown, bordering the beautiful Williamstow Gulf Road for more than a mile. No cutting of tree is to be permitted within 50 feet of the road. Othe parts of the tract will be used as a forestry demonstra tion area. This is the sixteenth State forest estab lished in Vermont.

County Funds for Forest Protection

Duplin County, N. C., during the present fiscal yea is devoting $2,500 to forest fire protective work i cooperation with the State Forest service. Thi appropriation follows one of $500 for the fiscal yea 1926 and is the largest ever yet made by a county o North Carolina for this purpose.

Profit on Cedar Thinnings in New Jersey

Cedar swamp thinnings made in 1925 by the Ne Jersey Department of Conservation and Developmen netted more than $100 per acre profit in stumpage although most of the trees cut were suppressed and were less than 4 inches in diameter at breast height Medium light thinnings were made on the Lebano State Forest in white cedar stands less than 50 year age, several thousand small poles being cut. This as the first thinning undertaken by the State's restry division on a commercial basis. This fall and inter cedar thinnings are being continued on the ebanon Forest on a much larger scale, poles and posts all sizes being cut. In moving poles and logs from e swamps to auto trucks a trial is to be made of the e of a light car pushed by man power on a light rtable steel track.

New York Plants Twenty Million

The final score for forest planting in New York ate in 1926 shows the output of the State nurseries 20,481,112 trees. This exceeds the combined pro-ction of 1924 and 1925. There was a remarkable crease in school forests, schools ordering more than ice as many trees as in the preceding three-year riod. The number of municipal forests in the State ew during the year from 153 to 217, and municipali-s received 2,482,900 of the trees distributed by e State. The State itself planted 5,058,950 trees.

Orders for young trees to be planted in the spring of 27 which had been received by the conservation mmission of New York up to November 17 totaled 00,000.

Sportsmen Plant a Million Trees

The silver reforestation cup offered to the organized me clubs of New York State by James S. Whipple, mer conservation commissioner, was won by the Cortland County Sportsmen's Association. This club was responsible for the planting this year of 507,000 trees. The Shawangunk Fish and Game Association, Middletown, ranked second, with 128,500 trees, and the East Aurora Fish and Game Club was third with 117,550. Trees planted by other clubs entered in the contest brought the total to practically 1,000,000.

A memorial forest of 10,000 young white pines was planted by New York State on September 27 as its tribute to Gene Stratton-Porter. The site chosen for the memorial lies on the west side of the Tongue Mountain Peninsula, at the head of Northwest Bay, Lake George.

Muskegon County, Mich., has taken up reforestation as a major project. In 1925 it planted more than 150,000 spruce and pine trees, and its 1926 plantings exceeded 200,000.

An overhead sprinkling system has been installed at the Louisiana State Forest Nursery at Woodworth, La., which makes it possible to simulate a fine rainfall over a 4-acre nursery site. By nine hours' steady running it can produce the equivalent of 1 inch of rainfall.

Additions to the State forests of New Jersey within the last six months total 1,295 acres. The Stokes Forest was enlarged by 653 acres, the Lebanon Forest by 535, and the Bass River Forest by 107.

Education and Extension

ccessful Essay Contest Adapted for American Forest Week

In a campaign to get the idle land in Schuyler unty, N. Y., planted to white and red pines, Ex-sion Forester Cope and County Agent Bond have s fall aroused much public interest through a public ool essay contest. The subject assigned was "Why uld we plant forest trees on the idle lands in Schuyler unty?" All children attending district schools h not more than four teachers were eligible. The o school superintendents of the county wrote to all teachers emphasizing the importance of the forestry blem and asking that pupils be encouraged to enter contest. One month was allowed for the submis-n of essays. All essays were forwarded to the local m bureau office, where they were reviewed by three lges. Prizes of $10, $5, and $3 were awarded in h of the three districts into which the county had en divided for the purposes of the contest.

In almost any community a forestry essay contest culminating at such a time that the prize winners may be announced and the prize essays published during the coming American Forest Week, April 24–30, 1927, would be one of the most interesting and helpful events of the week. The plan of the Schuyler County Farm Bureau Essay Contest is therefore given here, with suggestions by W. R. Mattoon of the United States Forest Service for adapting it to other communities:

Suggestions for Conducting a School Essay Contest in Forestry

Purpose.—To interest school children in ——— County in better forest protection and growth.

Prizes.—First, three each, value $10 (or $5); second, three each, value $5 (or $3); third, three each, value $3 (or $1). (Suggested values only; money to be raised locally.) Special prize for originality, $5 (or less).

(Books, subscriptions to magazines, or potted ornamental trees or shrubs make good prizes.)

Eligibility.—Any child in the public schools of ——— County in the ——— to ——— grades is eligible.

Rules.—1. Essays shall be on the subject. Suggested subjects: (1) How the forests of ——— County serve the people; (2) What is being done to protect the forests of ——— County and what more should be done; (3) Why we should plant forest trees in ——— County; (4) How we can use and enjoy the forests; (5) The important forest trees in ——— County; (6) My favorite tree in our woods at home.

2. The essay shall consist of not more than 500 words, and shall be written in ink on — by — inch paper, on one side of the paper only.

3. Each essay must be placed in a plain envelope bearing the name, age, school district, and address of the entrant.

4. The contest opens the ——— of ———, and closes the ——— of ———, 1927. (It is suggested that dates be so chosen as to make possible the announcement of the prize winners and the publication of the essays during American Forest Week, April 24–30, 1927.)

5. Each teacher shall forward all essays entered by his pupils to the farm bureau office (or other designated place) in ——— not later than ———, 1927.

6. For the purpose of awarding prizes the county shall be divided into three (or more or less) districts as follows:

No. 1. ———, ———, ———.
No. 2. ———, ———, ———.
No. 3. ———, ———, ———.

A first, a second, and a third prize will be awarded in each of these districts. A county-wide prize for the most original essay will also be awarded.

7. A committee consisting of (1) ——— ———, (2) ——— ———, and (3) ——— ——— will make the awards. In awarding the prizes consideration will be given to—

1. Grasp of the subject.
2. Logical and convincing presentation.
3. Composition and appearance of manuscript.

8. Information concerning these forestry topics may be secured by observation in the woods or from the local public library, the State forestry department, the extension service of the State college of agriculture, or the Forest Service, United States Department of Agriculture.

NOTE.—The announcement and copies of the rules should be sent out to the teachers by the county school superintendent, together with his personal recommendation of the contest.

Maryland Warden Organizes Junior Forestry Movement

A remarkably well planned junior forestry movement has been set afoot in Cecil County, Md., by District Forest Warden J. Fredrik Virgin. It began last spring with a series of illustrated lectures. Mr. Virgin, who as a clergyman is no stranger to the platfor talked in every high school and practically every lar grammar school in the county, and visited, as he puts every grange, parent-teacher organization, and ci club he could get into. He found it comparative easy to interest his audiences in forest conservati because the spring of 1926 was the worst fire season ev known in the district. This winter he is going ov the ground a second time, in some places repeating l lectures, and training schoolboys as "junior foresters Nothing more needs to be said of Mr. Virgin's abilit as a forestry propagandist than that both town a country boys are eagerly tackling a long series requirements in the hope of being enlisted in his juni forest-protection army.

To be eligible for commission as a junior forester boy must be 12 years old and in regular attendance school (a few exceptions being made in favor of bo who have passed through the seventh grade and a working on farms). He must be able to identify least 10 native trees, exclusive of domesticated fru trees, by their shape, bark, leaf, and fruit; must kno the forest laws of the State of Maryland as outlined in synopsis furnished by the State department of forestr something of the approved methods of fighting fore fires, and the names, locations, and telephone numbe of the two forest wardens nearest his home; and mu submit an essay of 150 words on the value of trees t the community and the State. In addition he mu have fair standing in school work, must be activel interested in athletics and outdoor sports, and mu have a certificate of good behavior and charact signed not only by one of his parents and his teach but by two farmers living in his own community.

The commission bears the signature of the Stat forester, and the examination and pledge are made i his presence or that of his deputy.

The junior forester is expected to keep an activ lookout for forest fires at all times, and particularl during the months of March, April, May, October, an November. If he finds a small fire that he can readil extinguish he is expected to do so, and he is to assis the forest warden in fighting large fires in his territory when this will not interfere with his schoo duties. He is to watch for violations of the fores laws. If he sees people unlawfully destroying trees o shrubs it is his duty to call their attention to the la and, if they disregard his warning, to report them t the forest warden and to the owner or tenant of th property. He is to assist the State forester in distributing forest fire warning signs whenver requeste to do so.

The Maryland Forestry Department furnishes junio foresters with its monthly news letter and with thos of its publications that will help them in their work For exceptionally meritorious service a junior foreste will be eligible to honorary membership in the Maryland Forestry Association, and graduate junior foresters will be given first consideration in the selectio of forest wardens.

"As most of the rural boys travel long distances school, and in many cases are picked up by busses nd carried to the larger centers," says Mr. Virgin, we expect that the junior foresters will become a rps of rangers traveling practically every road of e district. We hope to catch many fires in the art, and have the knowledge present to cope with em. Howver, I am making it clear that the boys e *not* fire fighters. They will be most valuable as eventive agents."

County Forestry in Arkansas

Bradley County, in the south-central part of Arkans, was one of the first counties in the State to make a stematic attack on its forestry problems, writes xtension Forester W. K. Williams. In 1925 County gent C. S. Johnson, with the help of W. R. Mattoon the United States Forest Service, began to develop e interest of bankers, lumbermen, and farmers in cal forestry possibilities. In a short time two farmers d offered the use of timberlands bordering on main ads for demonstration thinnings, which are now arly completed. Later a county forestry committee five farmers was appointed to work out recommendaons as to the proper handling of Bradley County rm woodlands. This committee has now submitted program with a set of 12 recommendations.

According to these recommendations, the average radley County farm should have not less than 50 res devoted to the growing of timber as a cash op, and these woodlands should at all times be otected from fire. Overcrowded stands of young ees should be thinned at intervals of five years, the ood cut being sold or used for billets, pulpwood, eated fence posts, or firewood. Mature timber ould be marketed each year from a block of 5 acres, one-tenth of the total woodland, a complete circuit us being made in 10 years. The farmer should do s own logging if possible; and if he sells his timber anding he should first make a careful estimate and ould use a timber-sale contract including the prosions necessary for the perpetuation of timber owth. There should be no cutting of vigorous rifty pine less than 14 inches on the stump or of rdwood less than 16 inches. Stumps should be cut t higher than the diameter of the trees, and in no se higher than 12 inches. From two to four seedoducing trees per acre should be left standing. In lling trees care should be taken not to injure the ung growth, and no dead tops should be left against e trunks of living trees.

The program points out that of the 68,000 acres of rm timberland in Bradley County two-thirds is actically idle, because of woods fires and wasteful tting, whereas if well set with pines and protected om fire it could be producing an average clear profit from $2 to $3 an acre yearly.

The five farmers who formulated this program constitute a permanent committee or county board to assist County Agent Johnson in his forestry work. Immediate plans include a dozen forestry demonstrations, of one or two acres each, well distributed over the county.

Plan for Forestry Teaching at New England Summer Camps

Plans for helping city boys and girls to get acquainted with the woods were discussed in a conference held at Boston, Mass., November 27 under the leadership of the Society for Protection of New Hampshire Forests. This society in cooperation with the State university has helped more than 500 farm boys in New Hampshire forestry clubs to learn how to take care of their home woodlands. Now it is reaching out to teach woodcraft and forestry to the thousands of city children who annually spend two months in summer camps. At the November conference the directors of 10 New England summer camps met with representatives of the Boy Scouts, Girl Scouts, Camp Fire Girls, and Y. M. C. A., and with nature-study leaders of several universities. A plan was drawn up for the teaching of woodcraft and forestry in camps, especially in New Hampshire, during the summer of 1927. First teaching the child how to live enjoyably in the open, this plan would lead on to a full appreciation of the relation of the forest to everyday life, and then to elementary forestry.

Some of the subjects suggested for summer camp work are: How to build a camp fire and how to put it out; how to select a camp site and build a shelter; what to take into the woods; what to do on discovering a forest fire; how to follow a compass line and make a simple map; what to do if lost; how to identify tree species; how to mount wood specimens; how to plant, thin, and harvest trees; and what to look for on a visit to a logging operation, a wood-using plant, or a lookout tower.

Course on the Care of Street Trees at Syracuse

A special short course on the care and protection of street, roadside, and shade trees was given by the New York State College of Forestry at Syracuse, N. Y., November 15–20. Members of the college faculty assisted by E. P. Felt, State entomologist, and Hollis J. Howe, city forester of Baltimore, gave lectures on tree pruning, physiology of tree growth, tree diseases, paints and preservatives, tree characteristics, tree repair, planting, moving, insect enemies, sprays and spraying machinery, municipal forestry, and laws relating to street trees. Discussions and field trips rounded out the course, which was arranged by the college in response to a large volume of inquiries on these subjects from municipalities and private individuals. The course was attended by 38 representatives of utility companies of New York State. Several representatives of telephone, telegraph, and lighting companies attended for instruction on the installation and maintenance of overhead wires as they relate to shade trees.

Outlines of the lectures included in the course are available in mimeographed form and can be obtained, so long as the supply lasts, by addressing Paul D. Kelleter, director of forest extension, New York State College of Forestry, Syracuse, N. Y.

Arbor Day in Mississippi

In celebrating December 10 as Arbor Day, schools and communities of Mississippi this year had the help of an attractive illustrated bulletin gotten out by the State commission of forestry under the title "Arbor Day in Mississippi." Opening with Governor Whitfield's proclamation designating December 5 to 11 as "Plant-a-Tree Week," the booklet presents a program for Arbor Day including the text of a number of poems and songs and a series of "forestry facts." Detailed directions are given for the planting of little trees and for their later care, with a charge and pledge to be used in assigning the custody of the newly planted trees. Valuable features are a simple method of giving the actual tree planting a dramatic setting, and a description of the characteristics, use, and soil and moisture requirements of 12 Mississippi tree species suitable for Arbor Day planting.

School Forest for the University of Montana

The forestry school of the University of Montana has acquired 1,500 acres of natural forest land located in Pattee Canyon about 3 miles from the campus, through the cooperation of the War Department and the Department of Agriculture. This forest, which comprises several million feet of western yellow pine, Douglas fir, and western larch, was established in 1878 as a source of timber supply for Fort Missoula. In recent years it has not been used by the War Department, and it has now been turned over to the school of forestry under a special use permit for a te of 50 years.

County Tree-Planting Campaign

The first tree-planting campaign to be put on i any county of North Dakota under the direction the extension forester is being planned for Mountr County under the leadership of County Agent Clau Ebling. The cooperators will agree to prepare the land as directed by Extension Forester Charles Gillett, and trees will be furnished to them at abo $20 per thousand.

Studying Forestry in the North Woods

Twenty-nine seniors of the University of Maine i November left Orono for nine weeks in forestry cam Their camp is located at Grindstone, in the deep woo of northern Maine. Its use is given to the universit by the Great Northern Paper Co., which has a lumbe ing operation in progress at Grindstone. Gilbert Stewart, assistant professor of forestry, was put i charge of instruction at the camp, with the assistanc of a man from the State forestry department and a officer of the Great Northern Paper Co.

A series of sawmill meetings in different parts o Ohio, beginning with one at Rome, Ashtabula County on December 8, has been arranged by Extension Forester F. W. Dean. At these meetings Mr. Dean wi demonstrate farm woodland management and method of sawing, piling, and grading, and will give advice o marketing timber and lumber.

Norway pine seed gives a revenue of from $1,000 t $2,000 a year to the forest experiment station at th University of Minnesota, which has within its boundaries a large tract of timber of this species. The see is the most expensive kind used in reforestation projects, selling at $22.50 a pound.

Forest Service Notes

The Famous Casement Report

By Will C. Barnes, U. S. Forest Service

Before proceeding to analyze and comment upon the report on national forest range appraisal recently made to the Secretary of Agriculture by Dan D. Casement, it may be well to say something of the man selected by the Secretary for this important bit of work.

Casement was born on an Ohio farm. At the age of 15 he began to learn the elements of cowboy life on an open cattle ranch in western Colorado. After graduation from Princeton he returned to the range country and took full charge of an outfit running more than 3,000 cattle with a permit in a nearby national forest. Some years later the need of a place where his steers could be finished for market resulted in the purchase of a rather extensive farming property near Manhattan, Kans. Here Casement became acquainted with Secretary Jardine, then president of the Kansas Agricultural College. Casement has for many years been prominent at western cattle shows, meetings of livestock organizations, and farmers' conferences, and has a wide acquaintance among western stockmen. His background of experience, education, and acquaintance, therefore, fitted him admirably for the somewhat difficult and undoubtedly unpopular job which the Secretary wished on him.

Previous to 1905 no charge whatever was made for the use of national forest ranges. When the first forested areas were set aside by presidential proclamation in 1897, each stockman desiring to graze stock on them was required to secure a free permit which specified the maximum number of stock he was to bring on the forest. This was intended to prevent overstocking.

On many of the forests, especially in the Southwest, the grazing of sheep was absolutely prohibited at first, owing of course to the belief on the part of the foresters that while all livestock grazing was to a certain extent detrimental to the forests the grazing of sheep was especially injurious. Later, on the basis of investigations by Gifford Pinchot and Frederick V. Coville, the grazing of sheep was permitted on a majority of the ranges. This policy was put into effect by a circular of November 26, 1900, of the General Land Office of the Department of the Interior, which at that time administered the "forest reserves." On February 1, 1905, the administration of the reserves was transferred by Congress to the Department of Agriculture.

On July 1, 1905, the Secretary of Agriculture for the first time established definite charges, to be effective January 1, 1906, for the grazing use of the national forest ranges. The annual fees for cattle varied from 35 cents in the Southwest to 50 cents in the Northwest. The fee for sheep was established at one-third the rate for cattle.

In announcing this initial charge for grazing Secretary Wilson made the following statement: "These prices will be gradually increased when market conditions, transportation facilities, and demand for the range warrant such action." Thus the assertion so frequently made by western livestock men that the Government originally had no intention of making a charge for the grazing of livestock on the national forests, or that the first charges were intended to cover only the cost of administration, is not well founded.

The grazing fees as established in 1905 were changed very little until 1912. That year the Secretary of Agriculture set them on a slightly higher basis, the average increase in the annual fee for cattle being about 5 cents. In 1915 a new schedule was put into effect, annual fees for cattle ranging from 48 cents a head in the extreme Southwest to 75 cents a head in California and the Northwest. In this year also the ratio between cattle and sheep fees was changed, the sheep fee being figured thereafter at one-fourth the cattle fee instead of one-third. In 1916 the maximum for cattle was raised to $1.25 but the minimum was left at 48 cents.

During 1916 considerable agitation by certain members of Congress for further increases caused the Forest Service to make a fairly wide study of the situation. The result was a statement by Secretary of Agriculture Houston under date of November 3, 1916, that all grazing fees would be increased by 12 cents to 20 cents per head on March 1, 1917, and that further increases would be put into effect in the two following years establishing the fees on a basis of from 80 cents to $1.50 per head per annum in 1919. This plan was later modified so that beginning with the grazing season of 1917 all fees were increased 25 per cent over the amounts charged in 1916. Further increases were postponed during the war; but by order of Secretary Houston the increases provided for by the order of November 3, 1916, were put into effect in 1919. No increases have been made since then.

At the hearings of the House Committee on Agriculture in December, 1919, and February, 1920, on the appropriation bill of 1920, the committee insisted that the grazing fees be raised about 300 per cent. The Forest Service urged a delay because of the five-year permits then in effect, which the Forester considered a quasi contract between the Government and the stockmen. Further, the service explained that the value of the forage could not be definitely stated without a thorough study of the whole question of private land grazing values. The Forester promised the committee this would be made as soon as possible. When the appropriation bill came before the House for a vote an amendment directing the Forester to increase the fees 300 per cent was defeated on a point of order.

The Forest Service then began a careful study and appraisal of the ranges under the immediate direction of Inspector of Grazing C. E. Rachford. This work was brought to a close in 1924, and is a monument to Mr. Rachford's energy, ability, and power of analysis.

Final action on the appraisal report was forestalled by the untimely death of Secretary Wallace, in October, 1924. His successor, Secretary Gore, in the comparatively short period of his administration did not act upon the report, but made the decision that, owing to the unsettled condition of the livestock business at the time, no increases in grazing fees should be made prior to the season of 1926. Secretary Jardine, who took office on March 4, 1925, further postponed the increases until January, 1927.

On the recommendation of the Forest Service, Secretary Jardine early in 1926 requested Dan D. Casement to make a careful review of the Rachford range appraisal report and its basis, making such visits to the various national forest ranges as in his judgment were necessary. This investigation was completed on June 30, 1926.

In his preliminary statement to the Secretary, Casement says:

> In the course of the investigation I have visited all of the western forest districts, and many of the forests therein; have inspected many of the tracts in private ownership forming the basis of comparison by which the grazing value of the forest areas is appraised;

> have checked the report with forest officials in the various districts; have obtained the views of many representative holders of grazing permits on the forests; and have interviewed the lessors and lessees of many range tracts in private hands.
>
> The investigation has been undertaken and prosecuted with an entirely open mind, save for certain beliefs I have long held relative to our national forest policy. * * * I held the belief that the creation of our national forests and the control and administration by Government of their grazing resources had benefited the users of these resources to a degree in striking contrast to such status as they and their industry could have obtained through unrestricted use of unreserved and unappropriated public range. This belief was grounded in the observations of 35 years and in personal experience as a user of public range for a long period and subsequently as a grazing permittee on a national forest. I still maintain it.

Briefly, Casement in his report to Secretary Jardine upholds the contention of the Forest Service that the current grazing fees on the national forests are much lower than they should be in view of the prices paid for the same classes of grazing on private lands either within or immediately adjacent to the national forests. He finds the methods followed by the Forest Service in appraising the national forest ranges to be just and fair and based on sound economic principles. It is Casement's opinion that the Rachford appraisal, in its endeavor to be absolutely fair to the stockmen, "leans backward to the advantage of the permittees." He feels that the use of the forage resources of the national forests at the comparatively low fees now charged by the Forest Service gives the permittees using the national forest ranges a distinct advantage over stockmen who do not have access to these ranges. (He finds that the carrying capacity of the national forest ranges permits their use by only about 1 out of 3 range stockmen in the 11 western range States.) He is "unable to reconcile with the facts the claim made by many permittees that this apparent advantage is more than neutralized by handicaps and hardships attending the use of the national forests."

Casement does not agree that the restrictions imposed by the Forest Service justify a lower scale of fees than that maintained on privately owned land. This because he finds that most of the leases for privately owned land which is used by the stockmen and which is closely intermingled with national forest land contain many of the restrictions imposed by the Government in permitting the use of its land. In his opinion the leases on nearly all of these private lands are really less stable than the forest permits, a majority of the private leases reviewed by him being for but one year while a large number of the grazing permits now in effect on the national forests are for 10-year periods.

Speaking of the Rachford appraisal report as a whole, Casement says:

> The report has real worth, not only in that it records the results of an honest and exhaustive effort to fix appropriate values as reflected by rental returns from like private lands, but also in that it contains a large fund of useful data relative to the value of improvements constructed on the forests and bearing on the costs and losses incident to handling stock thereon.
>
> These data are of great importance not only to the service but to forest users and to the public as well.
>
> Furthermore, from a study of the appraisal's practical application it is apparent that its range ratings and allowances are truly reflected in the fees which it recommends and that the results embody proper deduction from the data used.

On analyzing the various plans advanced for determining the value of the national forest grazing land Casement concluded that the plan adopted by the Forest Service, namely, the appraisal of range values by comparison with the average rental of private lands was the only reliable, satisfactory, and fair method.

Considering that grazing fees are a minor item in the whole cost of livestock production in the West, Casement does not agree with the contention of many of the stockmen that any increases in grazing fees, no matter how small, would be highly injurious or even ruinous to the livestock industry in general. Nor does he agree that the acceptance of these fees will promote an increase in rates for grazing-land leases in forest States. Instead, he believes it may accomplish an opposite effect.

While concurring in the final figures of the Rachford report, Casement considers it advisable to eliminate certain peak charges in several of the States where, in his judgment, unusual conditions have forced the values of grazing on private lands to points not justified in general. The new fees proposed by the Forest Service represent an average increase of approximately 47 per cent. Casement recommends that when the peaks in several States have been eliminated the proposed increases be scaled down approximately 25 per cent straight through; that the resultant increases become effective in installments beginning with 1927, 25 per cent of the increase being put into effect in that and in each of the three subsequent years.

Casement comments on the working out of the 640-acre grazing homestead law in part as follows:

> In practice it has plainly failed to benefit permanently or substantially those who, under its provisions, have filed on 640-acre tracts. I have seen none on which the original claimant still resides. Practically all are abandoned. It has to no useful purpose diminished a public asset long shamefully neglected and abused but still possessing potential grazing values, which could be restored and augmented under intelligent direction and control by Government.

In criticism of the forest homestead act of June 11, 1906, he writes:

> Only in very exceptional instances has it benefited the true homeseeker even in the slightest degree, while it has seriously hampered the operations of established permittees on the forests and has heavily handicapped the work of the Forest Service in handling the grazing problem.

On forwarding Casement's report to the Secretary of Agriculture the Forester fully approved its recommendations.

Secretary Jardine, in order to amplify his personal knowledge of the situation, intends to meet representatives of the western range stockmen at the joint convention of the two national livestock associations, the National Woolgrowers and the American National Livestock Association, in Salt Lake City, Utah, on January 24, 1927. The Secretary will give the stockmen every possible opportunity to discuss both the Casement and the Rachford reports.

National Forest Land Exchanges

By L. F. Kneipp, U. S. Forest Service

Consummated land exchanges during the fiscal year 1926 added 14,230 acres to the net area of the national forests.

During the 4½ years which have elapsed since the enactment of the general exchange law of March 20, 1922, the Forest Service has pursued a conservative policy in the matter of exchanges. Undoubtedly the disinclination of the service to accept and approve the inflated land values resulting from war and postwar conditions has restricted the acquisition of lands through exchange. A turn in the tide now seems to be under way and, at least so far as the Pacific Coast States are concerned, the acreage offered at prices acceptable to the Forest Service now approximates or exceeds in value the land-and-stumpage resources that may be employed for exchange purposes without departure from sound principles of silvicultural and financial management.

During the months of October, November, and December, 1926, 33 exchange cases were submitted to the Secretary of Agriculture for approval. They contemplate the reconveyance to the United States of 76,717 acres of land and the grant in lieu thereof of 1,549 acres of national forest land, and stumpage to the value of $192,534 to be cut from 12,063 acres of national forest lands.

Several of the cases sent to the Secretary were of outstanding interest and importance. One on the Shasta Forest contemplates the conveyance to the United States of 22,183 acres of land supporting a stand of 61,000,000 feet of timber, the appraised value of the property being $65,065. A case on the Wenatchee National Forest, if consummated, will revest in Government ownership 12,000 acres of land, much of it supporting well-advanced yellow pine second growth, the valuation in this case being $24,326. On the San Juan and Montezuma National Forests, in Colorado, a case has been submitted that would restore to Government ownership 6,900 acres of yellow pine type, half of the area uncut, the rest well restocking, the appraised value being $53,869.

The Kaibab Bug Epidemic is Over

By E. E. Carter, U. S. Forest Service

"Not enough insects to justify the continuation of experiments and studies." This note in a recent letter of the Bureau of Entomology ends the story of the Kaibab epidemic of Black Hills beetle (*Dendroconus ponderosa*, Hopk.). The epidemic started about 1920, reached its peak in 1923 and 1924, broke in 1925, and disappeared in 1926. It killed many millions of feet of standing timber, cost the United States more than $75,000 to fight, and gave the best opportunities of recent years for studying the insect under epidemic conditions and for conducting large-scale experiments in control methods.

The western yellow pine timber on the Kaibab Plateau of Arizona is isolated. To the south the Grand Canyon is a 13-mile-wide gash in the earth's crust. On the west, east, and north, the surrounding country is treeless for many miles. The billion feet or more of timber on the plateau is virgin forest, practically inaccessible because so far from railroads. When the epidemic of Black Hills beetle broke out the scientists of the Bureau of Entomology regarded it as a not unmixed evil, for here was the best chance to study the bug since the Black Hills epidemic of 1905–1912. The isolation of the timber body at least reduced the number of possible complicating factors.

Now they tell us that this epidemic of 1920–1925 was merely the latest of many epidemics that have occurred on the Kaibab from time to time. Through past decades and centuries the bugs have killed off the old timber, making room for the reproduction to grow but never, of themselves, wiping out the forest.

Man's part in this latest epidemic? The Forest Service spent over $60,000 killing the bugs by cutting infested trees and peeling or burning the bark. The park service did the same thing on the smaller timbered areas in the Grand Canyon National Park. The Bureau of Entomology told both services what to do, and helped do it. There was not enough money available in any year to do all that should have been done, but literally millions of bugs were killed each year in which control work was done.

Man did not break this epidemic, so far as can be determined now, but he helped. The epidemic developed its own destruction, and the killing by man was like Saul's thousands compared with David's tens of thousands. A dead bug, like a dead Philistine, gives no more trouble. On the Kaibab predacious insects multiplied and grew fat. Also after the first few years the flat-headed borers multiplied even faster than the Dendroctonus beetles and developed the charming habit of eating out the cambium of attacked trees ahead of the Dendroctonus larvæ, so that said larvæ starved. The balance of nature was asserting itself. Man hastened the consummation of nature's efforts. Now the epidemic is past. But a new one may start any time.

Underground Fires

By J. B. Holm, U. S. Forest Service

During a serious blowup on the Quartz Creek fire, on the Kaniksu National Forest, last summer, the fire jumped the Priest River and in an hour was rolling toward White Tail, threatening to burn the lookout and destroy the entire Jack Pine Flats beyond. The men on the lookout fled for their lives, leaving their belongings behind. During the night, however, the fire subsided and the lookouts returned to their station. In two days this fire was trenched and under control. A part of the old White Tail Road that had served as a buffer to swerve the fire from its rush toward the lookout was used as a part of the fire line. Along the old road stood a large dead snag which burned so persistently that it was almost two days before it was cut down. The stump was buried repeatedly but continued to smolder like a partially extinct volcano, emitting an occasional wisp of smoke. After several days the stump and adjacent burn were considered dead. Then one afternoon the lookout on White Tail reported a fire near the old road, spreading rapidly. All available men were rushed to the spot and by midnight the fire had once more been put safely inside a trench.

The following morning I decided to make a thorough examination as to the origin of the fire. We took the old road between the old and the new burn and were just passing the old stump when our car broke through the tread of the roadway. Upon examination we found that a root from the old outlaw stump had burned beneath the road and had broken out just 16½ feet from the old snag's base. The course of the root was easily traceable. Had the old roadway held up, perhaps the snag's secret would never have been disclosed and the cause of another fire would have remained a mystery. Had weather conditions been unfavorable, also, the work of the preceding three weeks might have been lost through the treachery of that root fire.

Another such incident occurred on the same fire, with less serious results. In this case the root led the fire beneath the trench for more than 6 feet before it broke out.

Some Effects of the Florida Hurricane

By R. M. Evans, U. S. Forest Service

About the middle of October I had occasion to visit Pensacola and the Choctawhatchee Division of the Florida National Forest. In Pensacola and vicinity evidences of the big September hurricane still remained—boats that had been beached, a wrecked drawbridge, unroofed houses, much of the four-mile causeway of the new Escambia bridge washed out, windows in the Federal Building covered with boards, etc. But the most interesting manifestation was the effect of the wind and the wind-driven salt spray upon trees in the city and along the bay and Santa Rosa Sound.

As might be expected, broad-leaved trees in exposed locations had been stripped of their leaves by the very force of the wind, and fruit and nut crops had suffered. Peach trees here and there were in bloom. Pecans were putting out new leaves, and groves of these trees were clothed in tender green as in spring. But evergreens, particularly the pines, had quite the opposite appearance. Wherever these trees had been exposed to the vast quantities of salt spray driven in from the Gulf they were as brown as though scorched by a hot fire. This effect was noticeable to a considerable distance back from the water, but probably nothing more serious will result than a new crop of leaves next spring.

Of course, considerable timber was blown down, but damage of this nature on the national forest was less than was anticipated. Timber worked for turpentine suffered less on the national forest than on private land, the reasons being shallower and more careful chipping and shallow incisions in inserting aprons. It was one more vindication of Government methods. Enough timber did blow down on the national forest, however, to show that worms entering at the edge of the face and through faces that have been burned or have stood until the pitch oxidizes are doing an unforeseen amount of damage. This factor will have to be given more consideration in the future.

A Field Station for the California Forest Experiment Station

A field station is to be established by the California Forest Experiment Station on land belonging to the city of San Bernardino. The tract is located in the Devil's Canyon watershed and consists of about 40 acres of bench land at an elevation of approximately 2,600 feet. This land was farmed for some time before being acquired by the city, and it includes about 15 acres of orchard and vineyard. The soil is of very good quality and ample water is available from several springs. An excellent nursery site has been selected in a protected cove. This nursery will be under the direction of the California Forest Experiment Station but will be financed largely by the five or six southern counties of California and local forestry associations, which will receive from it stock for watershed planting. The slopes surrounding the clearing are typical of the southern California brush fields. As all the adjacent lands belong to the city of San Bernardino or to the Forest Service there will be plenty of room for experimental plots of all kinds.

Longleaf and Slash Pine Seedling Survival

Preliminary analysis of the data on seedling survival which Professor Hayes of the University of Louisiana recently gathered for the Southern Forest Experiment Station has brought out the following comparisons: Two-year-old plantations of slash pine showed a survival of 69 per cent on slopes compared with 76 per cent on the flats where it naturally grows. One-year-old slash pine plantings showed an average growth during the 1926 season of 18 inches on ridges compared with 23 inches on flats. One-year-old slash plantations had a survival of 78 per cent on flats, 70 per cent on slopes, and 61 per cent on ridges. Rabbit damage was serious on the ridges and slopes but slight on the flats.

ong-leaf and slash 1-year-old seedlings growing on a tural long-leaf ridge-top site gave survival percent- es of 73 for slash and 86 for long leaf, with some rabbit mage to the slash seedlings. On a similar area long af showed a survival of 88 per cent, as against 62 per nt for slash. These preliminary figures indicate that ere may be considerable danger in attempting to ant tree species out of their natural habitat.

Growth of Planted Western Yellow Pine

Some western yellow pine planted in the spring of 17 in a cleared sagebrush area in Ephraim Canyon, the Manti National Forest, were measured this fall. ut of 19 trees, 6 had attained a height of at least 4 et and 2 had reached a height of nearly 5 feet. The erage height growth of all the trees was 6.7 inches 1925 and 8.7 inches in 1926. In 1926, 12 trees made height growth of 8 inches or more, with a maximum 16 inches. In 1925, only 7 trees grew 8 inches or ore, with a maximum of 10.5 inches. The splendid owth in 1926 is all the more remarkable because of the drought conditions existing during the past growing season.

The range of the blue spruce (*Picea pungens*) as recorded by the Forest Service has recently been extended southward through information contributed by F. L. W. Grubb, supervisor of the Prescott National Forest. Mr. Grubb determined that this species, previously not shown by Washington records as ranging south of the Santa Fe National Forest, exists on both the Datil and Gila National Forests.

A survey of beetle losses in 1926 in the western yellow pine timber in Klamath and Lake Counties, Oreg., outside of the boundaries of the present southern Oregon pine beetle control project was begun on October 21 by the Klamath Forest Protective Association and the Forest Service. This survey is the fifth of its kind to be made on this area in successive years. It will cover 2,186,000 acres of Government land and 962,000 acres of land in private ownership, and 17,390,000 board feet of timber.

General Forest News

ines—A Cash Crop for Southern Arkansas Farms

By W. R. MATTOON, U. S. Forest Service

A bountiful cotton crop in 1925 and a 4,000,000-bale erproduction in 1926 have flooded the market so that en the big planters of the rich Mississippi bottom nds are unable to sell their cotton for anything like hat it cost them to grow it. In this emergency any of the farmers of the South are cutting timber d hunting fur-bearing animals to tide themselves d their families over until next fall. It has been ell said that timber is the farmer's bank account.

Much of the land now in cultivation in the pine ction of Arkansas will grow cotton only sparingly less heavily fertilized. Fertilizer costs money. otton is still for thousands of farmers the only ricultural crop.

How does loblolly pine compare with cotton as a ofitable crop on the less fertile cut-over pine land of uthern Arkansas? Agronomists of the United States epartment of Agriculture have figured out that in adley County, Ark., where cotton growing requires bstantial applications of fertilizer, cotton sold at e average market price of the past five years brings a profit of about $1.30 an acre. The landowner in uthern Arkansas who grows loblolly pine on a 40-ar rotation as a crop—keeping out fire, thinning s stand two or three times for pulpwood or excelsior ood, and marketing both pulpwood and sawlogs at a ipping point or mill—can at present prices make a t profit of $2.30 an acre over and above a 6 per cent ofit on his investment in land. Here is the way is business of growing timber works out:

Profit from 1 acre of pine timber grown as a crop

Money returns from timber crop:	
20,000 board feet of saw logs in 40 years, at $10 per thousand delivered at the railroad or mill	$200.00
25 cords of pulpwood cut in thinnings and in the final cutting, at $5 per cord	125.00
	325.00
Cost of growing and marketing the crop:	
Rental of land worth $10 per acre for 40 years, at 6 per cent compound interest	92.85
Taxes, at 10 cents per acre per year, and fire protection and care at 5 cents per acre per year for 40 years, at 6 per cent compound interest	23.21
Cost of logging and hauling saw logs and pulpwood to railroad or mill	117.00
	233.06
Profit on timber crop:	
Clear profit per acre over 40-year period of growing the crop	91.94
Yearly average net profit per acre, over good wages for man and team and a 6 per cent compound interest return on the investment	2.30

This average net yearly profit from the poorer type of land, of $2.30 per acre above a good rate of interest on the money invested, is believed to be a conservative estimate for either short-leaf or loblolly pine. It will of course vary considerably with different conditions. Bankers and farmers in several parts of southern Arkansas have expressed the opinion that a net income of $2 to $3 an acre is a very satisfactory return on land of this type. Prices for second-growth pine timber, which have been mounting rapidly during the past few years, are likely to continue to rise, so that a greater profit than that shown may reasonably be expected.

Forest Conservation Ideas of 40 Years Ago

By R. K. Helphenstine, jr., U. S. Forest Service

In 1886 the Department of Agriculture issued Miscellaneous Special Report No. 10, "Descriptive Catalogue of Manufactures from Native Wood." This report was devoted primarily to a description of the department's forestry exhibit at the World's Industrial and Cotton Centennial Exposition held in 1884–85 at New Orleans, La. It presented information based upon data obtained from manufacturers in various parts of the country through the medium of a questionnaire, referred to in the letter of transmittal to the Commissioner of Agriculture as a "special interrogatory." One of the questions in the "interrogatory" drew forth from at least 100 manufacturers statements of their views on the general aspects of the forestry question, future timber requirements, and forestry legislation. The opinions of some of these manufacturers of two score years ago were expressed as follows:

Burlington, Vt.: Will be exhausted in 25 years at present rate of consumption. Native woods should be planted, and forests protected.

Mobile, Ala.: As far as the Gulf States are concerned, the pine would last the sawmills for perhaps 100 years to come; but the timber will, I think, be practically gone in 30 years on account of the destruction wrought in the manufacture of turpentine and rosin. The work should be regulated by law.

Marshfield, Vt.: I am directly on the line of railroad, and cut nothing but the largest timber, leaving all of the small to grow up, which will be fit to cut in 20 or 25 years. It will surely pay to grow timber on or near lines of railroads better than any other crop.

New York City: Unless some more effective mode is soon adopted to protect the forests and incentive offered to plant, we shall in a short time have to depend upon other countries for our supplies.

Canton, N. Y.: The State should own the lands on the headwaters of our rivers and should control the cutting of timber.

Chicago, Ill.: There is cedar enough to last for 100 years, but it will be very expensive in 25 years from now. All railroads building west of Mississippi River, north of Missouri, and west of Missouri, south of Iowa, should have been forced to set aside two sections of land for each 10 miles of railroad built, for tree culture.

Philadelphia, Pa.: There is no question but that the timber is being cut faster than it grows. The amount consumed by the railroads for ties, in addition to the increased demand from abroad and the regular home consumption (constantly increasing with the increase of population), must force upon the country the necessity of legislation similar to that existing in Sweden, Norway, and Germany.

Bristol, Conn.: If I were a young man I would p one-third of my 30 acres in black walnut and wait for to grow; would reap a rich reward in days' decline.

Dayton, Ohio.: At the present rate of unnecessa slaughter of timber, the country will be denuded in years (hard maple). The larger forests are purchase and cleared for the profit there is in the timber. T farmer who has 100 acres of land, with 15 to 20 of forest, says "the taxes are so great, and the yield slight from his timber land, he is obliged to reduce t area," and so the forest must go. Removal of t from all timber land would, in a large degree, remo the necessity for cutting out the same on the cleare farms, as well as in the extensive forests.

Dague, Ohio: The timber we employ in our busine (cottonwood, elm, and sycamore) will be used up i five years, or nearly so, in the State of Ohio. The should be legislation to prevent the wanton destru tion of first-growth timber by the sawmill men. The are at least 40 sawmills in Paulding County.

Chicago, Ill.: Everybody seems to know that o forests and our resources in this line are nearly ruine already, but every one wishes only to enrich himse without regard to the future. We should have earne legislation.

Grand Rapids, Mich.: The wholesale destruction lumber should be counteracted, especially of har wood kinds, as it will take a long time to repair d ficiencies by the growing of trees.

Ewing, Mass.: There should be practical legislatio to replace the wholesale slaughter of timber throughou the country.

An Oklahoma Operator Grows Timber

By George R. Phillips, State Forester of Oklahoma

The Choctaw Lumber Co., Idabel, Okla., whic owns approximately 500,000 acres of virgin and cut over short-leaf pine land in southeastern Oklahoma has begun to practice forestry with the idea of operatin its land on a sustained-yield basis. It employs consulting forester, who has laid out the plan for thi work and is now supervising its operation.

More than a year ago this company instructed it woods crews to leave all trees 14 inches and less i diameter on the stump unless there were a considerab number of these small trees grouped close together, which case the stand was to be thinned moderately If no trees 14 inches or less in diameter occurred for considerable distance, but larger ones occupied th area, a sufficient number of the larger trees were to b left to insure a successful seeding of the area. Unde this practice the cut-over area has stocked with stand of fine young second growth and a second cut oftentimes of greater volume than the first—is assured in from 15 to 30 years.

For a time brush crews following the loggers lopped tops and pulled them away from the young standing timber in order to lessen damage in case of fire. This practice has been abandoned, owing to excessive cost, and all efforts put on fire-prevention work.

Before the diameter-limit cutting plan was introduced practically everything was cut, leaving a tangle of low-grade hardwoods with but few small pines to act as seed trees. As a result considerable areas of the ompany's holdings will be a long time coming back a good stand of pine, even with adequate fire pro- ection. Areas of this sort from which fire has been ept out for a year or two are now coming up with ttle pines, however, indicating that artificial means reforestation will not have to be resorted to if fire kept out.

The company is expending considerable money and fort on fire protection and is cooperating with the ate forestry commission in this work. Two steel okout towers and approximately 150 miles of tele- one line have been put up. A forester is employed devote his entire time to this work.

evived Interest in International Forestry Bibliography

By C. F. KORSTIAN, U. S. Forest Service

One of the outstanding developments in interna- onal forestry affairs during 1926 was the revival of terest in an international forestry bibliography. This terest developed simultaneously in Europe, in India, d in America.

The foundation for an international forestry bibli- raphy was laid at the fourth meeting of the Interna- onal Union of Forest Experiment Stations, held at ienna in 1903. A bibliographic commission was rmed at that time, consisting of Doctor Bühler, of ubingen (chairman); Doctor Opperman, of Denmark; orest Inspector Crahay, of Brussels; Adjunct Böh- erle, of Mariabrunn; and Dr. Philip Flury, of Zurich. t the fifth meeting of the union, at Stuttgart in 1906, d the sixth meeting, at Brussels in 1910, the uestion of a bibliography was further considered. he commission was then increased to seven members rough the appointment of Doctor Hesselman, of ockholm, and Doctor Beck, of Tharandt. A final ecision regarding the bibliography was to have been ade at a seventh meeting in September, 1914, in ungary, but this meeting was postponed because of e outbreak of the World War.

In 1925 Doctor Flury prepared a tentative scheme r the classification of forestry literature, based rgely upon the one used at the Swiss Forest Research stitute, which he proposed as the starting point in veloping an international forestry bibliography. At international conference held in Zurich April 23 and , 1926, an attempt was made to adopt a classification forestry to serve as the basis of the international bliography. Prof. Walter Mulford of the University California, the representative of the United States this conference, reported that the discussion, which ntered on two schemes proposed by Doctor Flury d Doctor Oppermann, led to no decision.

At the International Forestry Congress at Rome in ay, 1926, still another system for filing information forestry was proposed by Mr. S. H. Howard, of ritish India.

The forestry classification scheme prepared by a committee of the Society of American Foresters[1] is being incorporated in the Extension Handbook of the Extension Service of the United States Department of Agriculture, which is expected to appear during January, 1927. This scheme has been used by the editor of the Dewey Decimal Classification in preparing the twelfth edition of that classification.

The forestry section of the International Congress of Plant Sciences held at Ithaca, N. Y., August 16 to 23, 1926, devoted one session to a symposium on the question of an international forestry bibliography, and the resolutions adopted by this congress included the following:

> *Resolved*, That it is the sense of the forestry section of the International Congress of Plant Sciences that it is in favor of seeing an international forest bibliographic commission organized, and that those nations having forestry organizations be invited to establish a national forestry commission, the chairman of which shall be a member of the international forest bibliographic commission; that the international forest bibliographic commission have an executive committee of five members, the duty of which shall be to decide what organization shall issue a bibliography and to devise means for carrying on the work.

It seems probable that the International Union of Forest Experiment Stations, which, according to present plans, is to be revived, will inherit the major responsibility for an international forestry bibliography.

The Railroad Fusee—A Possible Fire-fighting Tool

From article by H. B. ROWLAND, District Forester, Warren, Pa.

This season I experimented in the use of railroad fusees for back-firing, trying them on as many fires as possible. Altogether I believe they were highly successful, and I think they are even more economical than the big torches.

In the first place, the big torch is heavy and clumsy and unwieldy in the brush. Usually the man who carries it is good for little or no other work than carrying it along. If he is used for something else, he usually hangs his torch in a tree and when the crew move on and the torch is again needed they use makeshift methods of firing rather than have him take the trouble to go back over the line to get it. In addition, back-firing is usually only short-time work, so that most of the time the torch man is loafing along with his torch or has entirely dropped it and is doing other work.

The flame of the torch is not sufficiently hot in most cases to make easy and fast firing. Nor does it force its way down into the leaves; in burning usually the flame is toward the top, and it is necessary to poke the torch down into the leaves for firing. We made a test of some torches and found that when freshly filled with oil they burn for from 40 minutes to an hour. For longer firing than this one must necessarily carry a can of oil, which is another item of encumbrance on the fire line. In most cases the torches leak very badly when filled with oil and if they are carried in the truck or around the woods for any length of time a large part of the oil wastes away, which means that oil must always be carried in the car for filling before going into the woods or else must be carried into the woods.

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[1] Journal of Forestry 21, 148-161, 1923.

Now for the fusees as we tried them. There are the 5-minute and 10-minute fusees, which actually burn 6 or 7 minutes and 12 or 14 minutes respectively. They weigh only 4 and 8 ounces apiece and are self-lighting. They can not be extinguished by wind or rain. They burn with a very hot, hissing flame which squirts out from the front end several inches. It is especially easy to fire the leaves with them, both because the hissing flame goes into the leaves and because it generates great heat. As I said before, back-firing is usually short-time or intermittent work, so the short-time fusees could easily be used on short sections of line. One man can easily carry in his pocket enough of the larger size fusees to last more than an hour, and several members of the crew can carry a pocketful apiece without inconvenience to anyone, every crew member remaining available for constructive work.

These fusees cost in gross lots 6¼ cents apiece for the small size and 8⅓ cents apiece for the large ones, which while seeming expensive is, I believe, quite economical as compared with carrying torches and oil and delegating one man to handle this material on the fire line. They are the regular railroad fusees. It may be, if we find it practical to order them in large quantities, that the manufacturer could modify them slightly in order to make them cheaper. With us the heat and burning are the only consideration, while with the railroad the color, lighting, and other points have to be considered.

Treated Ties Give Good Service in Trolley Tracks

At the annual meeting of the American Electric Railway Engineering Association in Cleveland, October 4 to 8, one of the association's committees reported on a special study of the use of treated wood. By circulating a questionnaire this committee has brought together information indicating that general adoption of the use of treated wood would save a great deal of money for the electric railways, as it already has for the steam roads.

About 60 per cent of 140 electric railway companies addressed by the committee answered its questionnaire. Most of these stated that they were making some use of treated timber. Many companies had begun the practice too recently to make any conclusive statements as to its results, but a few reported on the basis of long experience.

The Georgia Railway & Power Co., of Atlanta, Ga., has creosoted pine ties in good condition after 31 years of service, first in open track and later in pav track. The city of Denver, which uses creosoted t extensively, reports their average life as 19 yea St. Louis has used pressure-creosoted ties in all newals in open track since 1912. Minneapolis has i stalled about 200,000 creosoted ties since 1907, wi good results. Treated ties installed there in 1917 wh removed recently on account of reconstruction we found in such good condition that they were used ov again, while untreated oak ties of the same length service had to be scrapped.

"Such instances disprove the old theory prevale among electric railway engineers and officials, that ti need last no longer than the paving in which th are laid or the life of the rail in heavy traffic," remar the Wood Preserving News. "A properly treat tie should last as long as almost any paving and r and still be available for reuse."

The cost per tie per year on electric railway including pavement replacement, was revealed the study as follows:

	Untreated ties	Treated ties	Savin effecte
Bituminous macadam paving	$0.59	$0.57	$0.
Asphalt paving	1.08	.90	.
Granite block paving	1.64	1.38	.
Open track	.37	.28	.

Forest Protection Conference at Syracuse

Forest protection problems having to do with fir insects, fungi, grazing, wild life, and sanitation we discussed at the Forest Protection Conference he November 10 to 12 at the New York State Colle of Forestry, Syracuse.

William G. Howard, assistant superintendent State forests of New York in charge of fire protectio in the opening address of the conference said:

> The average acreage burned over each year in t Adirondack and Catskill regions has been reduced less than 10 per cent of what it was just prior to 190 so that at present there is only about one chance in thousand of a given area of land being burned ov in any one year, a degree of hazard which it is claime is an insurable risk and as such justifies investment forest plantations and growing forests in New Yo State.

Mr. Howard mentioned as part of New York's fi protection equipment a system of 64 standard fi observation stations, with steel towers and telepho lines.

Paul W. Stickel, of the Northeastern Forest Exper ment Station, in discussing the relation of meteorol gical studies to forest fire prevention stated that "f central Massachusetts, 58 per cent of all the day during the spring fire season had a relative humidit of 50 per cent or less. This 58 per cent of all the day accounted for 81 per cent of the number of fires, 9 per cent of the area that was burned, and 98 per cen of the damage caused."

Prof. S. N. Spring of Cornell, in a paper on grazing, aid:

> Two million acres out of 3,800,000, the total area of voodland in farms in New York State, are being astured, and are therefore on the down grade toward inal extinction. Furthermore, the percentage of area astured is on the increase * * *. Grazing slowly ut surely changes conditions, more rapidly if many nimals occupy the wood lot. The soil is trampled and acked, roots of shallow-rooted trees become exposed nd as mature and overmature trees come down or re cut out with none to replace them, the litter disppears and grass replaces it. These grasses growing n the partial shade lack great nutritive value and teal food and moisture from the trees. * * * In he maple-sugar industry it has been found that the ap run is best from ungrazed maple wood lots.

In discussing game management Prof. A. V. S. ulling, of the Roosevelt Wild Life Forest Experiment tation, brought out the fact that deer usually conregate in slashes or burns to eat young sprout growth nd that a burn or slash growing up to maple and oplar sprouts alongside a cedar swamp or spruce hicket area is ideal winter quarters for the animals. Deer have tough picking in old-growth upland rests," said Professor Pulling. "A plantation surunded by old growth might be badly injured if the nimals wintered in the vicinity. Deer, of course, live n aquatic vegetation in the summer, so far as they n get it, so real reproduction damage is confined to a w winter months."

Harvey J. MacAloney, Northeastern Forest Experient Station, in discussing the white pine weevil pressed the opinion that "the most advantageous d cheapest way to grow white pine to protect it om the weevil and to control the injury is to grow in mixture, preferably in groups with species that ill be of value in the final crop. Hemlock and the tter hardwoods, such as oak, ash, and hard maple, e advised."

Papers were presented on the gipsy moth and the hite pine blister rust. In discussing the latter Dr. . H. York, forest pathologist for New York State, id:

> In advocating the substitution of species of forest ees for planting in place of white pine, we lose sight the important principle that forest tree species hile free from any known pests to-day may not be 15 to 20 years from now. * * * Already we have illions of trees of a foreign pine growing in New York, commended for planting very strongly because it has pests. But no one knows just how this species will act toward our native forest tree fungi and insects.

Other subjects treated at the meeting were "Federal rest fire prevention in the Northeast," "What are e basic essentials of fire control," "Problems arising om the recreational use of forest areas," "Protection forest plantations in New York State," "Present atus of insect infestation in forest areas of the ortheast," "The rôle of fungi in the disposal of ush," and "Decay in relation to length of rotation."

Regional Accessibility and Stumpage

The important bearing of regional accessibility on stumpage prices is brought out by a tabulation of second-growth pine stumpage prices in States of the South Atlantic and Lower Mississippi regions. How much higher prices are near large consuming centers is shown by the following table, prepared in connection with the forest taxation study of the United States Forest Service:

Stumpage prices of second-growth Southern yellow pine, by States

State	Price per M	State	Price per M
Delaware	$9.70	Alabama	$2.52
Maryland	8.97	Mississippi	2.22
Virginia	5.60	Arkansas	4.04
North Carolina	5.27	Louisiana	4.57
South Carolina	4.02	Oklahoma	1.93
Georgia	3.41	Texas	3.77
Florida	1.88		

Dendroctonus Monticolae in Two Western Forests

Control operations instituted in the past season against an epidemic of *Dendroctonus monticolae* on the Bitterroot and Beaverhead National Forests resulted in a fairly efficient clean-up on the Beaverhead Forest, the Bureau of Entomology states. The $17,000 allowed for the purpose did not, however, permit the treatment of more than the extremely advanced groups of infested trees on the Bitterroot Forest. The outbreak on the Bitterroot Forest, which began four or five years ago, has since been destroying hundreds of thousands of lodge pole pine and western yellow pine trees every year; on the Beaverhead, where the insects established themselves within the past two or three years, the infestation has threatened to become equally serious.

At Sula, Mont., intensive studies of *Dendroctonus monticolae* begun by the Bureau of Entomology in 1925 were continued through the 1926 season.

Naval Stores Meetings and Field Days

A field day for naval stores operators was held at Camp Pinchot on the Florida National Forest on November 4, under the auspices of the Pine Institute of America and other agencies. Seventy turpentine operators (representing about 1,500 crops) and land owners went through the woods and examined the turpentining methods practiced by the United States Forest Service. They saw trees with turpentined faces 37 inches high which after 4 years' work had yielded as much gum as trees worked by common commercial practice with faces 90 inches high. The use of fire towers and other means of forest protection was also shown.

A second conference held by the Pine Institute of America at Biloxi, Miss., on November 6, was attended by about 75 per cent of the Mississippi turpentine operators. This was followed during the month with well attended meetings at Bainbridge, Valdosta, and Brunswick, Ga., and a field day at Starke, Fla.

Southern Pine Association Optimistic about Timber Growing

Timber growing is mentioned in a statement issued recently by H. C. Berckes, secretary-manager of the Southern Pine Association, as one of those things that need no argument.

"During the year just passed," said Mr. Berckes, "reforestation won over a number of new friends in the southern pine field. It is quite evident that there is no danger of this species of wood becoming extinct, commercially or otherwise, during the next half century, if ever. The new growth during 1926 approached closer to the cut than ever before since the industry was established. From all indications the practice of reforestation within a few more years will have become so widespread in the South that the annual growth of southern pine will more than replace the annual consumption of the mills."

The cost of producing, distributing, and selling southern pine during 1926, according to this statement, was distributed on the average as follows: 37 per cent for labor, 19 per cent for supplies used in manufacturing and for repairs and similar expenses, 15 per cent for general overhead including selling expenses, 9 per cent for depreciation, and 23 per cent for stumpage.

Planted Pines in Hawaii

Trees native to the Temperate Zone have made remarkable growth at high elevations in Hawaii, according to a report by C. S. Judd, superintendent of forestry of the Territory. Coulter pines set out by Mr. Judd's predecessor 15 years ago at an elevation of 6,750 feet, east of Puu Nianiau on the private land of Kalialinui, have attained a height of 25 feet and a diameter at breast height of 12 inches. These pines are bushy and spreading and have deposited a mat of needles at least 6 inches deep, affording excellent watershed protection. In the same plantation western red cedars of the same age are now 21 feet high with an 8-inch diameter at breast height, and white pine trees are 17 feet high with a 6-inch diameter.

Privately Owned Arkansas Land Under Forest Management

Hall, Kellogg & Co., consulting foresters, have been given charge of nearly 29,000 acres of land in southern Arkansas on which the Moline Timber Co. recently concluded lumber operations. The land lies in Ouachita, Dallas, and Clarke Counties and is mostly well consolidated in the lowlands of the Ouachita River. It carries a good growth of young trees, largely of the better hardwoods but including a considerable proportion of pine. Hall, Kellogg & Co. assume full responsibility for the management of the property and will develop it for timber production. They have organized a fire-protection plan and will undertake some experimental work in order to exterminate the large worthless hardwoods. At present they are carrying on tie operations to remove some of the hardwoods not suitable for saw logs.

Laboratory of Western Pine Association

A lumber-testing laboratory has been put into operation by the Western Pine Manufacturers' Association in Portland, Oreg., under the direction of Albert Hermann. Mr. Hermann is a former member of the staff of the U. S. Forest Products Laboratory who in 1923 became manager of the association's lumber-seasoning department. The laboratory is equipped for the measurement of shrinkage of commercial sizes of lumber and for measurement of heat transmission of building material and wall sections, doors, and windows, under conditions very closely approximating those of service. Essential standards of measurement are checked against Bureau of Standards equipment. The projects authorized at present include a study of the relation of density of wood to thermal conductivity.

Increase in Preservative Treatment of Ties

Only 21 per cent of the railway ties purchased in 1911 were given preservative treatment, says the American Wood Preservers' Association. In 1923 the proportion had risen to 39.5 per cent, and in 1925 it was 56.2 per cent. As late as 1923 the extension of the life of ties through treatment had not effected any decrease in the number purchased; but the number of ties purchased in 1925 was less by 18 per cent than the number purchased in 1923.

Blister rust control work in Vermont in 1926 covered 22,650 acres of land. More than 257,000 wild currant and gooseberry bushes were destroyed.

Foreign Notes

Forestry in Japan

From information given by Doctor Shirasawa, director of the Japanese Forest Experiment Station, to the assistant commercial attaché at Tokyo)

Forests occupy about 48 per cent of the area of apan proper, and about 65 per cent of the combined rea of Japan, Korea, Karafuto, and Taiwan. Of the 4,486,583 cho (the cho equals 2.45 acres) of forest and in the Empire, not much more than one-third is rivate property.

The Imperial Government maintains one forest xperiment station, and research is carried on also by ivisional forest offices which are in charge of State orests. These experiments deal usually with soil inuences on the growth of forest trees; the chemical nd physical nature of wood; methods of thinning; orest protection; meteorological observations; culture f trees for farm use; forest grazing problems; and eed testing. Special experiments now under way in ranch offices have to do with the growth of tropical orest plants in the Bohnin Islands and with methods of lanting field crops in forests.

Japan has four forest schools of university grade, as ell as a number of other institutions devoted to orestry education. The oldest of these is the Tokyo orest School, established in 1881. The four principal chools, those in the Imperial Universities of Tokyo, yoto, Kyushu, and Hokkaido, in 1924 graduated 672 udents.

Japan is especially dependent upon water supplies r the irrigation of rice fields. The rice crops are ndangered not only by drought but by floods and ndslides. The Government has therefore made the rotection of water supplies the principal object of rest research, and requires and subsidizes flood-ontrol work on private forests. Since 1923, when ndslides caused by the earthquake created vast amage, the Government has appropriated yen 000,000 annually for flood-control work. (The yen 1924–25 was worth between 37 and 41 cents.)

Subsidies for the restoration of waste lands have een granted since 1911. At the end of 1924, 16,847 ectares of waste land had been afforested at an xpense to the Government of yen 3,074,000.

Since 1919 the Government has subsidized the rearg of seedlings, either by prefectural governments by private individuals. Another subsidy is granted r the encouragement of the afforestation of bamboo ands, and still another is allowed to forestry associaons for the support of study, lectures, competitive hibitions of forest products, and investigations and periments.

Canadian Pulp and Paper

The paper manufactured and the pulp wood and pulp exported by Canada in 1925 were worth $202,783,017, according to a preliminary report by the Dominion bureau of statistics. This is 8.3 per cent more than the value of the 1924 production and is within 10 per cent of the record value of 1920.

Newsprint paper constituted 81 per cent of the total reported paper production of Canada in 1925, amounting to 1,536,523 tons, an increase of 11 per cent over 1924. In quantity of newsprint exclusive of hangings or poster paper produced during the year Canada practically matched the United States, the figures reported being 1,529,251 tons and 1,530,318 tons, respectively. Exports of newsprint from Canada amounted to 1,401,651 tons—an increase of 15 per cent over 1924. Of this total, 1,320,600 tons were for United States consumption.

Exports of wood pulp from the Dominion according to these preliminary figures rose 23 per cent in quantity and 19 per cent in value in 1925 as compared with 1924, the 1925 figures being 961,367 tons and $47,931,905. Canadian exports of pulp wood, entirely to the United States, amounted in 1925 to 1,423,502 cords, valued at $14,168,935.

Canadian paper and paper stocks imported into the United States during 1925 were valued at $138,700,000, which is 62 per cent of the total value of American imports of these materials during the year.

Timber in the Zapata Swamp, Cuba

The Zapata Swamp, in southern Cuba, has all the essential features of the Everglades and is even more interesting, according to H. H. Bennett of the United States Bureau of Soils, who recently made a reconnaissance soil survey of Cuba for the Department of Agriculture in cooperation with the Cuban Sugar Club. This great Cuban swamp of nearly 1,800 square miles includes an area of limestone that is filled with holes and covered with a variety of tropical trees. Silk-cotton trees 4 feet in diameter, mahogany, and many other kinds are found growing on this limestone area where not so much as a spoonful of soil could be gathered from an acre. These trees make their start in pockets and holes in the limestone where collections of leaves and slight accumulations of disintegrated rock furnished them with material for growth. The roots stray about over the surface of the rock in search of food, finally plunging through holes to find sustenance in soil hidden deeply in the cavernous recesses of the coral stone.

Throughout the rocky areas, one of which is more than 50 miles in length, there are patches of remarkably fertile red soil. Crossties of a fine quality of mahogany are brought out from these stony lands.

The Zapata Swamp is a paradise for the natives who are engaged in burning charcoal. These men often live for months in complete isolation, coming out only to market their product. Canals have been dug into the marginal areas for bringing the product of the kilns out to sea, where it is put on small schooners and carried to market. The entire island is a market place for charcoal, the national fuel for cooking. Here and there on the dry stony lands are the homes of families who make their living cutting crossties and manufacturing charcoal.

Low Fire Score for New Brunswick

With only 65 forest fires reported in 1926, New Brunswick established a new low record. The previous low annual total recorded by the provincial department of lands and mines was 103, for the year 1925, and the annual average for the six-year period 1920–1925 was 254. The fires of 1926 burned over 12,423 acres, which is less than one-third of the average for the preceding five years. The fact that fewer fires were caused during 1926 by people traveling in the forests may be partly attributable to the late wet spring and to the hordes of black flies and mosquitoes which later kept many fishermen out of the forests. At the same time greater precautions were taken by the provincial forest officers in checking up on travelers in the forests, and during two of the most hazardous periods the forests were closed to public travel.

Commercial Forest Nurseries in Germany

Germany has 160 commercial forest nurseries, with a total area of 3,500 acres. Of these 23, with an area of 2,650 acres, are located at Halstenbek in Schleswig-Holstein. The total output in 1925 was 1,070,000,000 conifers and 180,000,000 hardwoods. The nurseries at Halstenbek produced 65 per cent of all the conifers and 92 per cent of all the hardwoods. Germany's annual requirements for planting stock are estimated at approximately 1,532,000,000 conifers and 190,000,000 hardwoods—enough to plant about 500,000 acres. Approximately 30 per cent of the conifers and 5 per cent of the hardwoods are raised on the forests, the commercial nurseries furnishing the remainder.

Fire Protection in France

Wooded areas in France protected from fire during 1926 by syndicates of private owners with the cooperation of the Government totaled 75,000 hectares. The 12 syndicates thus taking advantage of a law of 1924 which provides for Government subvention of fire-preventive work by private owners, are located in the departments of Var, Gironde, and Dordogne.

Forest fires covering 2 hectares or more that were reported to the Ministry of Agriculture in 1926 prior to the fall rains numbered only 130. Forests in the center and north of France were almost entirely spared, the principal fires occurring around Bordeaux and Marseille.

Latvia Owns Most of Its Forests

From article in the Timber Trades Journal (London), October 30, 1926

The forests of Latvia cover about one-fourth of the country's area, or 25,000 square miles. Only 15 per cent of them are privately owned, and the State owns more than 83 per cent. Coniferous species, of which the chief is Latvian redwood pine, make up 78 per cent of the timber on the State forests. The timber exports of Latvia come mainly from the State forests. Since 1922–23, however, the State has not itself exploited forests for the export trade. It prepares timber and fuel for the needs of the State railways and for State departments, but otherwise sells its timber on the stump. Timber for sale is advertised for a month in the Government gazette and then sold at auction. Only in exceptional cases, when forests remain unsold after being put up to auction, is any other method of sale resorted to; the price in such cases is not reduced.

Canadian Association's Educational Activities

Lectures of the Canadian Forestry Association between April 1 and December 1, 1926, reached audiences totaling 282,414. In the month of November alone lectures in the schools of Quebec and Ontario reached 11,500 children. The association's magazine, Illustrated Canadian Forest and Outdoors, with its French edition, La Forêt et la Ferme, is being sent regularly to more than 10,000 schools.

Remarkable Cork Tree

A cork tree that returned 736 francs' worth of cork in 17 years is described by G. Saunie in the October number of the Revue des Eaux et Forets. This tree measures 5.65 meters in circumference at 1 meter above the ground and is situated in the commune of Saint-Jean-Pla-de-Cors in the Pyrenees Orientales. In 1908 cork amounting to 360 kilos was taken from the tree and in 1925 a harvest of 368 kilos was taken. The increase in quantity was due to the growth of the trunk, as the bark was removed from exactly the same place the second time as the first. Although it takes more than a century to produce such a tree, cork trees begin to make returns as early as at 20 or 30 years of age, according to M. Saunie, and the revenues increase from year to year. He suggests that heads of families might consider planting cork trees where possible, to provide income for their descendants.

Personals

Prof. L. J. Young, acting head of the forestry department of the University of Michigan, has been appointed director of the Michigan Department of Conservation, succeeding John Baird.

Charles C. Deam has resigned as State forester of Indiana in order to complete his series of botanical publications, of which two volumes entitled "The Trees of Indiana" and "The Shrubs of Indiana" have already appeared. His next book will be "The Grasses of Indiana." Ralph F. Wilcox, assistant State forester, has been named by the Indiana Conservation Commission as acting State forester.

Shirley Allen, forester of the American Forestry Association, is serving as secretary of the American Forest Week Committee of 1927.

Charles G. Dunwoody, director of the department of conservation of the California Development Associaion, has accepted the chairmanship of the national conservation committee of the American Legion.

L. D. Gilbert, secretary and general manager of the Southern Pine Lumber Co., Texarkana, has been made chairman of the forestry committee of the East Texas Chamber of Commerce. Assisting Mr. Gilbert on the committee are H. R. Safford, executive vice president, Missouri Pacific Lines, Houston; Senator I. D. Fairchild, Lufkin; O. M. Stone, Jasper; E. L. Kurth, Keltys; John Kunkle, Clarksville; and T. B. Warden, efferson.

Harry E. Weston has resigned as assistant professor of forest chemistry, New York State College of Forestry, to accept a position with Thomas H. Savey, jr., of Chicago, consulting engineer specializing in machinery for pulp and paper mills. He is succeeded by loyd C. Peterson, a graduate of the college.

R. M. Brown has resigned as assistant silviculturist, Lake States Forest Experiment Station, to join the aculty of the forest school of the University of Minnesota. He will teach forest mensuration.

W. R. Adams of the 1926 class of the New York tate College of Forestry has joined the faculty of the University of Vermont as an instructor in forestry.

Prof. Emanuel Fritz of the forestry division of the University of California is on sabbatical leave for the ear 1927. He will spend the entire year in the United States, studying various problems of the lumber ndustry and at the same time representing the Caliornia White and Sugar Pine Manufacturers' Associaon in the various lumber-consuming centers which e visits. Professor Fritz has been teaching wood echnology and lumbering at the University of Caliornia since 1919.

Albert Benjamin Cone of Chicago has joined the taff of the National Committee on Wood Utilization of the United States Department of Commerce as research director.

William Finlayson, K. C., of Midland, Ontario, has succeeded Hon. James Lyons as minister of lands and forests in the Ontario government. Mr. Finlayson has been a member of the provincial legislature since 1923.

Dr. C. A. Schenck, of Darmstadt, Germany, gave a series of lectures at the Pennsylvania State Forest School, December 15 to 18. He planned to go in January to Missoula, Mont., to give a three-month lecture course.

Eric Ostlin, of Sweden, has been brought by the American-Scandinavian Foundation to the United States, where he will spend about a year. He will visit the eastern forest experiment stations and the Forest Products Laboratory, and plans to see some of the better wood-using plants and industries such as those clustered about Cloquet and Bogalusa. Mr. Ostlin has been directing a systematic survey of all forest land in Sweden, which was begun about 10 years ago to determine whether Sweden was overcutting its annual growth, and which so far indicates that it is undercutting.

Prof. Toyokazu Suzuki, of the Agricultural and Forestry College at Suigen, Korea, is visiting the United States in the course of a trip around the world. He is spending several months at Cornell and has visited the Washington office of the United States Forest Service, where he made some inquiries into the timber sale and forest management methods of the service and the work of the forest experiment stations, one or more of which he will visit. He expects to spend two or three months in Germany and a similar period in Russia.

Officers elected by the Southern Forest Research Advisory Council in October are: Senator Henry E. Hardtner, chairman; Maj. J. G. Lee, vice chairman; and R. D. Forbes, secretary.

The officers and board of directors of the Empire State Forest Products Association were reelected at the association's twenty-first annual meeting, held October 7 at Ithaca, N. Y. George W. Sisson, jr., of Potsdam, is president; John N. Carlisle, Watertown, vice president; W. Clyde Sykes, Conifer, treasurer; and A. B. Recknagel, Albany, forester and secretary.

Officers elected by the North Pacific Section, Society of American Foresters, at its November 23 meeting are: C. S. Chapman, Tacoma, chairman; A. H. Hodgson, secretary-treasurer; Dr. J. S. Boyce, member of executive committee.

Officers of the Intermountain Section of the Society of American Foresters elected in December are: C. L. Forsling, president; R. E. Gery, vice president; and Lyle F. Watts, secretary-treasurer.

J. Gilbert Borton of Woodstown, N. J., State senator from Salem County, has been appointed land agent of the forestry division of the New Jersey Department of Conservation and Development.

Jack O'Rourke Shank, a graduate of the College of Forestry of the University of Washington in the class of 1922, has gone to Kiseran, Sumatra, as silviculturist for the United States Rubber Co.

W. Goodrich Jones, president emeritus of the Texas Forestry Association, has for the past two years been serving as the unsalaried city forester of Waco, Te Beautiful street trees and parks in Temple, Tex., a the mark of his previous residence there. Recentl Mr. Jones has published a 4-page leaflet entitled "Th A-B-C of City Forestry."

Correction: Dr. Louis J. Pessin has joined the sta of the Southern Forest Experiment Station, not tha of the Appalachian Forest Experiment Station as wa stated in the FOREST WORKER for November, 1926.

Bibliography

Trees and Shrubs of Mexico

By GEORGE B. SUDWORTH, U. S. Forest Service

"Trees and Shrubs of Mexico" is the title of a monumental work just completed by Paul C. Standley, associate curator of the United States National Herbarium. It is volume 23 of the contributions from the United States National Herbarium and comprises five parts which appeared serially from 1920 to 1926, part 5, the concluding number, having just been published. The completed volume represents the careful study of an enormous number of herbarium specimens, begun in 1918 and concluded in 1925. Altogether, the volume contains 4,525 pages, exclusive of indices, descriptive of all the known woody plants of Mexico, of which it is estimated there are some 5,700 different species and varieties.

The material studied comprises thousands of dried specimens now preserved in the National Herbarium. A large part of this material was obtained by collectors sent into Mexico by the National Museum and the United States Department of Agriculture. To these specimens have been added collections made by some 52 other botanists who travled and collected plants in Mexico. Among the well-known older collectors, now gone, once closely identified with the discovery of many of the woody plants of our Southwest, were F. S. Brandegee, J. L. Berlandier, Dr. Charles Mohre, Edward Palmer, and C. C. Parry.

The plan of Mr. Standley's work includes a survey of the growth of interest in Mexican plant life, and of those who were instrumental in promoting a knowledge of it, especially of the plants of economic importance. Brief descriptions are given of the family and generic groups, together with keys enabling the student to classify unknown trees and shrubs. The technical and vernacular names of the different species and varieties and brief descriptions of their distinguishing characteristics are given. So far as it is known the range is briefly noted, and mention is made of the locality from which the type specimen of a species was first obtained. Careful attention is also given to recording the economic uses of the different plants, particularly the uses made of the wood and other products of trees and shrubs.

Having to depend very largely upon the collectors labels and scanty field notes accompanying drie specimens to determine what species are trees and wha are shrubs, the author had much difficulty in clearin up this point. It is a notable fact that collectors, eve now, too often neglect to note the size of plants fron which specimens are taken.

It is natural to expect that there should be a clos relationship with the trees and shrubs of our south western sections bordering Mexico; in fact, such com mercially important groups of trees as Pinus, Abie Pseudotsuga, Taxodium, Juniperus, Libocedrus, Cu pressus, Quercus, Salix, Populus, and Juglans are some times represented on both dises of the international lin by the same species. In some cases it is difficult t say now in which country the tree originated. Thus 11 species of pines found within our border occur als in Mexico; 2 species of Pseudotsuga occur in bot countries; Abies concolor, common to our Rock Mountain and Pacific slope mountains, occurs in northern Mexico; 4 species of Juniperus occur both in ou Southwest and in northern Mexico; 2 species of Cupressus occur in these sections; and Libocedrus decurrens, common on the west slopes of the Californi Sierras, grows also in Mexico.

The largest group of hardwoods found in Mexico i Quercus. Mexico has 258 species, and 11 of these occur within our Southwest border. Ninety-three o Mexico's oaks have been known to science for 50 or 60 years, but 164 of them have remained unknown until very recently.

The great interest Mr. Standley's splendid work has for foresters is that it presents for the first time a comprehensive means of becoming acquainted with Mexican trees likely to be of commercial value in the United States. Heretofore the great forest resources of Mexico have, as a whole, remained very imperfectly known, except to a few students of special plant groups such as conifers, oaks, mahogany, etc. Mexico has also been explored from time to time by lumber and naval stores interests to find what supplies are available. But little has been done to bring together and publish the information so collected. Even if it had been brought together and given to the public, it must necessarily have lacked full usefulness because the writers would have had to depend on ocal vernacular names in discussing Mexican trees, and these would have been most confusing. In all uch accounts there would have been wanting the lefinite work of the trained botanist, now presented n this volume.

A National Program of Forest Research

By L. C. Everard, U. S. Forest Service

This volume is more than a program; it is a compendium of what has been done, what is being done, nd what needs to be done in forest research. Its ublication marks a distinct turning point in the history f forestry in America. Although much research in orestry has been done in the past, it has been what night be called pioneer research—research that was oncerned no more with revealing facts and principles n the field of forestry and wood utilization than with nding out what forest research could do and what it ught to do. Before a concerted attack could be made n the forest problems of America it was necessary o make surveys of the field with whatever instruments nd methods the surveyor could devise. The preparation of this report means that the preliminary surveys ave been made and forest research is ready for organation on a national scale; the various lines of work re ready for coordination; the objectives and the nethods for arriving at them can be set down with ufficient definiteness for an immediate development of he attack as soon as the necessary funds are available.

The volume contains a statement of the forest roblem of the United States, which involves making ill use of one-fourth of the entire land area for the roduction of timber, naval stores, forage, etc., and or other related purposes; supplying wood and other orest products to meet American requirements, which nount to nearly half the world requirements; and aintaining American forest industries, which rank ourth among all the industries of the Nation. It oints out the ways and means of solving this problem rough research, the funds needed for carrying on the ork, and the various fields that would be covered in coordinated program, including such subjects as rest management, forest protection, forest range anagement, forest influences, wild life and recreation, ilization of wood and other forest products, and rest economics. A chapter on the research agencies at would be included in a national program includes ctions on existing agencies—Federal, State, educaonal, and industrial—and their work, additional encies needed, the need for trained men, and the rrelation and standardization of the work.

The volume was prepared by Earle H. Clapp, of the nited States Forest Service, as the report of a special mmittee of the Washington Section of the Society American Foresters. The other members of the mmittee are R. C. Hall, who recently returned to e United States Forest Service from the Bureau of ternal Revenue, and A. B. Hastings, of the United States Forest Service, who was assistant State forester of Virginia at the time the report was prepared. The purpose of the committee in issuing the report was to stimulate forest research in the United States, and to indicate what is most needed and what funds are necessary to carry on the work. The report was published by the American Tree Association for the Society of American Foresters. Those wishing to obtain copies should write to the secretary, Society of American Foresters, Atlantic Building, Washington, D. C.

Report of the Federal Power Commission

Construction was started during the past fiscal year on 20 new water-power projects which will have when completed an installation of 1,220,000 horsepower, or 40 per cent as much as the total placed under construction during the preceding five years. Among the important new developments are the development by the Alabama Power Co. on the Coosa River with 180,000 horsepower; that at the Falls of the Ohio at Louisville, Ky., with 135,000 horsepower; the Conowingo development of 473,000 horsepower on the Susquehanna River in Maryland and Pennsylvania; and five projects in California aggregating 417,000 horsepower. The total of plants placed in operation or under construction under license of the commission since July 1, 1920, is 3,900,000 horsepower.

These figures are taken from the sixth annual report of the Federal Power Commission, for the fiscal year ended June 30, 1926.

Of particular interest to foresters as well as others who have to consider problems of the coordination of outdoor recreation with economic development is a chapter on the relation of water-power development to recreational facilities.

Recent State Forestry Publications

"Making Farm Woodlands Pay," by John W. Keller, chief of the bureau of extension of the Pennsylvania Department of Forests and Waters, gives detailed instructions and suggestions for the care of farm woodlands in Pennsylvania and for cutting and marketing the timber. The booklet is well illustrated, and includes a valuable extension feature in 10 concrete examples of good profit in growing and selling timber.

"The Farm Woodlot in New Hampshire," Bulletin 30 of the extension service of the University of New Hampshire, by Prof. K. W. Woodward and Extension Forester Fletcher, treats comprehensively of the growth, cutting, and marketing of timber and of the chief silvicultural practices including planting, in the pine and hardwood sections of New Hampshire. Mature and immature timber are discussed separately. Some handy log rules and yield tables are included, and the bulletin is illustrated with photographs and drawings.

"Forests and Forestry in South Carolina" is the first local State bulletin covering broadly the subject of forestry. Henry H. Tryon, extension forester, is the author. Mr. Tryon treats his subject with thoroughness and practicality. Not only does he tell what he thinks South Carolinians ought to know about their forests, but he has been careful to include answers to the inquiries he most often receives from them. The fire problem, forest management, and forest utilization are given special consideration. The bulletin is well illustrated with both photographs and graphs.

"Forestry: What It Is," by Page S. Bunker, State forester of Alabama, in 10 pages of text carries out the object thus explained in its preface:

> A clear view of any major development contributing to the welfare of the individual, community, and Nation requires adherence to the main theme. This is especially true in the case of forestry which carries with it so many incidental benefits that its primary objects are sometimes obscured. It seems advisable, therefore, to recapitulate briefly the fundamental purposes of this essential industry.

Studies of the Humus Layers of Coniferous Forests

The German summary of the latest Swedish Research Institute publication, an article by Dr. Henrick Hesselman entitled "Studies of the humus layers of coniferous forests, their peculiarities, and their dependence upon silviculture," has been translated by P. R. Gast and Paul W. Stickle of the Northeastern Forest Experiment Station, with the assistance of Mrs. Gast. This article emphasizes the significance of nitrogen in the nutrition of the forest and shows the interrelations of buffer action to hydrogen-ion concentration, which are dependent upon the species origin of litter (oak leaves, spruce needles, etc.) and upon the lime-rich or lime-poor character of the soil. These factors determine the rate of decomposition of the litter and the availability of nitrogen. This translation consists of 50 closely typewritten pages. If the demand warrants, it will be mimeographed. Requests should be addressed to the Northeastern Forest Experiment Station, Amherst, Mass.

Forest Fires in Florida

"Forest Fires in Florida," the pamphlet published by the Florida Forestry Association in cooperation with the United States Forest Service under the provisions of the Clarke-McNary law, came off the press in December all dressed up in a fiery cover. The purpose of this first of the so-called section 1 reports is "to give the people of Florida information about the devastating effects of forest fires, to point out the dependence of the wood-using industries and of the people as a whole upon the forests, and to outline measures for fire prevention and control."

According to this bulletin the great need in Flor is to build up an antifire sentiment. It is rec mended that the responsibility for this educatio work be vested in a State forestry department. basic forestry law is recommended by the Flor Forestry Association, the provisions of which indorsed by the United States Forest Service.

The bulletin is being distributed by B. F. Williams president of the Florida Forestry Association. I quests for it should be addressed to him, at Gainesvi Fla., and not to the United States Forest Service.

Fire-Control Principles Codified

The principles of forest fire control have been co fied by the eastern district office of the United Stat Forest Service and published in the form of loo sheets that are to become a part of the notebook every forest officer in the district. The code has al been prepared in the form of a poster, 18 by 21 inche which is to be given a conspicuous place in every di trict ranger's office. Any cooperating agency wishi copies of either notebook sheets or poster will furnished with them on request. Requests should addressed to the District Forester, Washington, D.

Fire Poster Available

An effective fire poster has been gotten out by th National Fire Protection Association in which pin are shown in silhouette against a red sky. The legen lettered in white, is "Think and Save our Forest Watch Smokes, Matches, Camp Fires." The dime sions are 12 by 16 inches. Copies can be obtained f $1.50 per hundred and $13.50 per thousand from th National Fire Protection Association, 40 Centr Street, Boston, Mass.

Recent Publications of the Forest Service

Department Bulletin 863, Forestry Lessons in Hom Woodlands (reprint).

Miscellaneous Circulars: 44, Forest Fire Contro (reprint); 71, National Forest Resources of Utah.

Yearbook separate, Forestry and Forest Products.

Farmers' Bulletin 1417, Idle Land and Costly Timbe (reprint).

Map folders: National Forests of the East and South Bitterroot; Madison; Manzano; The Strip Notch Blaze; The National Forests of the Southern Appalachians in Relation to Principal Motor Highways.

National Forest Administrative Maps: ¼ inch, Beaverhead, Cache, and Sawtooth; ½ inch, Florida.

Atlas folio, Modoc (Warner Mountain Division).

District map, National Forest District 6 (in two parts, Oregon and Washington).

Index map of the United States.

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FOREST WORKER

March, 1927

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UNITED STATES DEPARTMENT OF AGRICULTURE

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Announcements

Forest Soils Section to be Part of International Soil Congress

A section on forest soils will form a part of the International Congress of Soil Science to be held at Washington, D. C., in the United States Chamber of Commerce Building, June 13–22. Papers already on the program of the section deal with erosion, podsol formation in spruce forests, silviculture as a factor in retaining soil fertility, soil surveys and forest confiscation, and control of water level in swamps. It is expected that several foreign foresters who have been working in forest soils will attend, including Prof. Heinrich Hesselman, of Sweden.

Civil-Service Examination for Silviculturist

A nonassembled examination for the four grades of silviculturist is announced by the Civil Service Commission, to close early in May. The registers to be established by this examination, with salary scales, are as follows: Senior silviculturist, $5,200 to $6,000; silviculturist, $3,800 to $5,000; associate silviculturist, $3,000 to $3,600; and assistant silviculturist, $2,400 to $3,000. Positions to be filled from the register on this examination will be at the new forest experiment stations to be established this year in the Ohio-Mississippi Valley and the Middle Atlantic States, as well as at other forest experiment stations.

Pine Pollen Wanted

The Eddy Tree Breeding Station, Placerville, Calif., will greatly appreciate any assistance in obtaining pollen of species of pines that do not occur near Placerville; that is, of species other than western yellow pine, Jeffrey pine, digger pine, sugar pine, western white pine, and knobcone pine. Pollen of foreign speci will be especially welcome. Anyone wishing cooperate with the station by sending pollen is aske to notify it in advance as to the species. A speci vial will be sent from the station to protect the polle in shipment.

Nature Lore School at Briarcliff Manor, N. Y., in June

The eighth annual gathering of the Nature Lo School will take place at Camp Andree, the Nation Girl Scout Camp, Briarcliff Manor, N. Y., June 17 30, inclusive. Dr. William G. Vinal, of the New Yo State College of Forestry, Syracuse University, will a as director, and will be assisted by a staff of natu specialists provided through cooperation of the Gi Scouts, Boy Scouts, and Camp Fire Girls, the Buffa Society of Natural History, and the Palisades Inte state Park. The object of this school, which was orga ized in 1920 under the auspices of the National Associ tion of Directors of Girls' Camps, is to train natu teachers, nature counsellors for summer camps, natu guides, scout naturalists, and playground leader The first week of the 1927 course will be devoted t forestry study and the second week to methods i nature guiding. Information about the course may b obtained by addressing Miss Elin A. Lindberg, Nation Girl Scout Headquarters, 670 Lexington Avenue, Ne York City.

Texas Wants Long-Leaf Pine Mast

The Texas Forest Service would like to locate som long-leaf pine mast for planting on its demonstratio forest near Kirbyville.

Because the edition of this periodical is necessarily limited, its free distribution outside of the Government service is restricted to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

Material offered for publication in the Forest Worker should be addressed to the Editor, U. S. Forest Service, Washington, D. C.

FOREST WORKER

ashington, D. C. MARCH, 1927 Vol. 3, No. 2

American Forest Week

Chairmen of State Committees

 list of the chairmen of State committees for the servance of American Forest Week is given below. some cases acceptances have not been received as Forest Worker goes to press, so that there is a ssibility of a few changes.

labama: John L. Kaul, Kaul Lumber Co., Birmingham.
laska: Judge Charles E. Bunnell, president Alaska Agricultural ege and School of Mines, Fairbanks.
rizona: Fred J. Elliott, president Chamber of Commerce, Phoenix.
kansas: F. W. Scott, Huttig.
alifornia: Gov. C. C. Young, Sacramento.
olorado: A. V. Fagerstrom, Pueblo.
onnecticut: T. S. Woolsey, jr., care of Connecticut Forestry Asso- on, New Haven.
elaware: Dean W. A. McCue, University of Delaware, Experimental n, Newark.
orida: A. A. Coult, secretary Fort Myers Chamber of Commerce, Myers.
eorgia: Henderson Hallman, 732 Candler Building, Atlanta.
aho: Dean F. G. Miller, University of Idaho, Moscow.
inois: E. H. Burgess, Edward Hines Lumber Co., Otis Building, ago.
diana: Stanley Coulter, 213 South Ninth Avenue, Lafayette.
wa: E. T. Meredith, Meredith Publications, Des Moines.
ansas: Albert Dickens, Manhattan.
entucky: Tom Wallace, Louisville Times, Louisville.
ouisiana: Henry E. Hardtner, Urania.
aine: Forrest H. Colby, Bingham.
aryland: De Courcy Thom, 405 Maryland Trust Building, Balti-
assachusetts: Harris A. Reynolds, 4 Joy Street, Boston.
chigan: T. F. Marston, East Michigan Development Bureau, City.
innesota: Mrs. Willard Bayliss, Chisholm.
ississippi: Mrs. G. H. Reeves, 831 Madison Street, Jackson.
issouri: Julius Seidel, Seidel Lumber Co., St. Louis.
ontana: Rutledge Parker, State forester, University of Montana, oula.
ebraska: Hon. Samuel R. McKelvie, Lincoln.
evada: A. B. Flickinger, Red River Lumber Co., Reno.
w Hampshire, W. R. Brown, Berlin.
w Jersey: C. P. Wilber, State forester, Trenton.
w Mexico: Dana Johnson, editor Santa Fe New Mexican, Santa Fe.
w York: Hon. John D. Clarke, New York State Forestry Associa- 91 State Street, Albany.
rth Carolina: Col. Joseph Hyde Pratt, Chapel Hill.
rth Dakota: C. B. Waldron, State Agricultural College, Agricul- College.
io: Mrs. W. W. Milar, 405 Crosby Street, Akron.
lahoma: John Easley, Ardmore.
egon: F. A. Elliott, State forester, Salem.
nnsylvania: George H. Wirt, Department of Forests and Waters, isburg.
ode Island: Howard L. Hitchcock, West Kingston.
uth Carolina: C. F. Prettyman, president State Forestry Associa- Summerville.
uth Dakota: C. C. O'Harra, president School of Mines, Rapid City.
nnessee: Rutledge Smith, Tennessee Railroad Co., Nashville.
kas: R. A. Gilliam, 901 Cedar Hill Avenue, Station A, Dallas.
ah: Mark Anderson, Provo.
mont: K. R. B. Flint, Northfield.
ginia: Chapin Jones, State forester, Charlottesville.
shington: Dean Hugo Winkenwerder, University of Washington, le.
st Virginia: George P. Whitaker, Wheeling.
sconsin: F. W. Luening, managing editor, Milwaukee Journal, aukee.
oming: A. G. Crane, president University of Wyoming, Laramie.

American Forest Week Publications

The following special publications have been issued by the United States Forest Service for use during American Forest Week, 1927. No charge is made either for the publications or for postage.

President's Proclamation of American Forest Week.—One page. For use as poster in schools, post offices, libraries, and other public places.

Present Needs in National and State Forestry.—By William B. Greeley, Forester, U. S. Forest Service. An 8-page presentation of the salient facts regarding public and private forest-land ownership and policies, the need for more State forests and for State forestry movements, and recent progress in State forestry legislation.

Forestry Facts.—A 16-page pamphlet containing short items, paragraphs, and handy information for use by newspapers and by speakers, teachers, and others interested in preserving and perpetuating the forests. This pamphlet is of essentially the same character as the *Forestry Facts* issued in 1926, but contains much fresh material.

Program for Observance of American Forest Week, April 24–30, 1927, at School, Boy Scout, and Four-H Club Meetings, and Other Assemblies.—A 16-column folder, 3¾ by 8½ inches, containing program suggestions and material in the form of readings, songs, and recitations; largely identical with the program issued in 1926.

A Forestry Program for Women's Organizations.—A 14-page pamphlet, 3¾ by 8½ inches, containing material for a club or other meeting in the form of papers on various aspects of forestry, verse readings, brief verse extracts, and a song.

Trees a Money Crop.—A 6-page leaflet, 5¼ by 9 inches, containing an extract from an article by the president of the Federal Land Bank of Springfield, Mass., pointing out the reasons why a farm woodland in good condition is a financial asset.

Children Will Need Timber—Grow Trees.—A card, 4⅔ by 6½ inches, showing on the face the legend "Children Will Need Timber—Grow Trees—Save Them from Fires," with illustrations in silhouette of the growth and some uses of trees, and on the reverse text material on the benefits of the forest.

Envelope Stuffers.—*American Forest Week,* April 24–30, 1927, with a drawing and three printed slogans, 3 by 5¼ inches; *Keep the Forest Green,* with a drawing and a brief statement on the value of the forest, 3 by 5¼ inches.

Bookmark.—On the face "Grow Trees" in large letters, with a drawing, green on a gray background; on the reverse printed slogans, 2⅓ by 6⅔ inches.

State Forestry

Delaware Forest Conservation Commission Reports

The Commission for the Conservation of Forests in Delaware, created by an act of the general assembly of 1925, has made its report to the legislature of 1927. The commission recommends that there be created in the Delaware government a State forestry department, provided with adequate funds and empowered to cooperate with forest land owners, the Federal Government, and neighboring forestry departments, to prevent and extinguish forest fires, to purchase land for State forests, and in general to control all matters relating to forestry in the State.

The commission also recommends that any nonproductive lands owned by the State be made State forests. Here special mention is made of the State-owned sand-bar land that stretches almost without interruption along Delaware's entire ocean front. Other recommendations are legislation for reducing taxes on land bearing growing timber and for the protection and conservation of the holly tree, which in the lower counties of the State supports a considerable industry.

A bill introduced in the Delaware Legislature on the basis of this report would create a State forestry commission composed of the governor and four persons appointed by him, the governor to have a vote only in case of a tie. Under the terms of this bill a State forester would be chosen by the commission to hold office at its pleasure at a salary fixed by it. The State forester would be authorized and empowered, with the commission's approval, to appoint an assistant forester and such other officers and assistants as might be necessary. The sand-bar lands owned by the State would be created a State forest, and the State forestry commission would be given the power to acquire lands for additional State forests by purchase or gift. The commission would be designated as the agency to cooperate with the Federal Government under the terms of the Clarke-McNary law. A comprehensive system of forest fire protection would be provided, the State forestry department would be authorized to raise forest planting stock and to distribute it to the public at cost, and reforested lands when classified as auxiliary State forest lands would be assessed at not more than $1 an acre, the timber grown on such lands being subject to a yield tax of 10 per cent.

Texas Legislative Committee on Forestry Reports

The recommendations for a State forestry progra which the Texas Legislative Committee on Forestr submitted in its recent report are as follows:

1. While appreciative of the cooperation of th Federal Government in conserving our timber resourc and encouraging practical reforestation of our d forested lands, we firmly believe that the constructiv and judicious basis of cooperation between the Natio and the State in forest protection and reproductio should be that which will leave the control of suc cooperative operations to the State, and which wi leave the ownership of all lands dedicated to reforesta tion to the State and its citizens.

2. * * * The State should as soon as possib acquire such number of State forest areas, each sufficient size to permit of economical protection an administration, as would answer the purpose of prac tical demonstration in forest renewal and managemen Such demonstration forest farms or areas might ver profitably embrace as much as 100,000 acres dis tributed as to character of timber growth. * * *

3. Believing that a policy recognizing the fulles possible participation of our citizens in reforestatio enterprises is the most judicious, we recommend suc legislation as will make it feasible for private citizen and private capital to undertake the reproduction timber upon the deforested lands of the State. * *

(*a*) A constitutional amendment adhering to th following form: "For purpose of encouraging the con servation of the timber resources of the State and pro viding for the continuous production of a timber supply equal to the needs of the people in home building farm requirements, and the developing of commerc and industry, the legislature is empowered to enact just laws for the taxation of lands set aside for purpose of timber growing and for the supervision of such land and the administration of such laws."

(*b*) A forestry code to be enacted under authority of the proposed constitutional amendment should provide for the creation of a nonsalaried State board of forestry vested with authority to direct the work of the State forester; to accept registration of lands dedicated by private owners to timber growing; to determine a just valuation of all such registered land for taxation; to prescribe regulations and determine the xtent of public and private cooperation in the pro-ection of said lands from fire; and if deemed essential, o readjust such valuations of registered lands for tax urposes at stated periods and when the timber is eady to market; to require the payment, by the wners of all such registered lands, of a severance or ield tax on a graduated scale. Such enabling act ould necessarily provide for the collection of the eferred tax in the event lands dedicated to timber rowing are sought to be withdrawn from the registra-ion before maturity of the crop.

4. Pending the adoption of the constitutional amend-ent and the enactment of legislation so authorized, he existing State forestry department should be more dequately supported. Cooperative work in forest fire revention and control is necessary to secure the repro-uction of pine trees over large areas and to prevent the oung pine timber from being destroyed. * * * he State should make available for the protection ork a sum at least sufficient to match the fund the ederal Government is ready to designate for this urpose. * * *

The work already under way relative to assisting the mberland-owning farmers and farmers in the treeless ctions should be given increased recognition. * * *

In view of the serious insect infestation now affecting e remaining merchantable pine timber in east Texas, * * the State should take steps to work out easures for the control of such injurious insects and ake such information available to the timber owners.

In recommending reforestation by private owners of mber lands, the committee recognizes the obstacles at will certainly be raised from time to time of con-uity of ownership of dedicated lands, and the division estates and distribution of interests. This condition calculated to cause the withdrawal of many tracts of nds from reforestation purposes. To minimize this fficulty as much as possible the committee would commend that special effort be made to provide for ancing timber-growing projects, under registration th the State, through some form of long-time loans low rate of interest.

Two Forestry Acts Passed in Vermont

Two forestry acts have been passed by the Vermont gislature of 1927. One will permit the commissioner forestry to purchase additional land for forest rseries, and the second authorizes the governor to oclaim a closed fire season during periods of extreme ought. In such a closed season it is unlawful to ild a fire on or near forest land. Anyone violating t s regulation will be liable for all damages resulting f m his offense and will be subject to imprisonment not more than 30 days or a fine of not more than 0, or both.

Forestry Bill Passes South Carolina Senate

A forestry bill passed the Senate of South Carolina on February 18 with a large majority. The bill would provide for the creation of a State forestry commission of five members and for the employment of a technically trained State forester. Under the provisions of this bill the State forestry activities would be supported through an annual appropriation of $10,000, instead of through a severance tax such as was proposed in the forestry bill which the South Carolina Legislature rejected at its last session. Immediately upon its passage in the senate the bill was sent to the house for consideration.

Allotment of 1928 Clarke-McNary Funds

Allotments of Federal funds to the States for forest-fire cooperation in the fiscal year 1928, recently approved, will include both regular and extra allotments. The former in every State will be 8.5 per cent of the estimated cost of adequate protection, as compared with a rate of 7.4 per cent during the present fiscal year. For extra allotments a fund of about $110,000 will be available, which will be distributed to the States on the basis of State and private effort in forest fire protection.

The allotment for the forest tax study will be increased from $36,000 for the present fiscal year to $50,000 for the fiscal year 1928.

Big Spring Orders for New York Planting Stock

New York tree planters are ordering little trees from the State conservation department at the rate of 100,000 a day, and by mid-January had run the total up to about 9,000,000. A large percentage were repeat orders—the best possible sign of successful business. More trees had already been ordered for municipal or community forests, including a number of new county forest projects, than in any previous year.

More than two-thirds of the cities in the State, and many towns, villages, and school districts as well, have started forests of their own. New York City, Rochester, and Glens Falls have more than 1,000 acres each of watershed-protection forests which will in time supply lumber and wood. The village of Carthage has a planted protection forest of more than 600 acres, developed through annual plantings begun 16 years ago. The village of Livonia has recently purchased as a reservoir site a partly forested area of about 200 acres in the township of Conesus on which it plans this spring to make an initial planting of 20,000 trees.

Reforestation work has been done on county land in 28 counties of New York, and several counties have adopted definite reforestation programs. Warren County has planted 155 acres in a 350-acre forest project and Otsego County has adopted a 10-year reforestation plan involving the expenditure of $50,000. The board of supervisors of Essex County has appointed a county forestry committee to work with the conservation department in reforesting county lands, and in Monroe County a park commission has begun to examine areas suitable for development as county forests with a view of timber production, game protection, and recreational use.

An unusual private planting project for which trees are to be furnished by the New York Conservation Department is that of Wilson M. Powell, of Chatham, Columbia County. Mr. Powell, who has been planting trees since 1915 and has already put out 79,000, plans this spring to plant 10 blocks of 2,000 trees each, of species including red pine, Scotch pine, European larch, Carolina poplar, white spruce, Norway spruce, black locust, balsam, and white cedar. Each block will have a frontage of 200 feet on the road. It is expected that this plantation will in time afford an opportunity to study in one forest the growth of the different varieties, as well as being a demonstration of tree planting to all who pass on the road.

The New York Conservation Department charges $2 per 1,000 for 2-year-old seedlings and $4 per 1,000 for 3-year-old transplants, f. o. b. nursery, for planting on private land. For trees to be planted on public land no charge is made except for transportation.

County Forestry in Winnebago County, Illinois

Citizens of Winnebago County, Ill., pay an annual tax of 1 mill for the purchase and development of county forests. For the present fiscal year about $64,000 has been made available for these purposes, including $25,000 for the purchase of land. A balance of $35,000 for land purchase remains in the county treasury from last year. The county forests now total 701 acres, of which two-thirds is covered with heavy virgin timber. The county raises in its own nursery the planting stock needed for these forests, and in the spring of 1926 began to distribute planting stock to private landowners. This year the county forester, Tange Lindquist, is taking over the work of protecting and planting roadside trees.

Timber Along Michigan Highways

The State Highway Department of Michigan is going halves with the Marquette County Road Commission in a $10,000 purchase of timbered land a one of the State trunk line highways. The dep ment has for several years given considerable atten to the landscaping of roadsides, its standard righ way width ranging from 100 to 150 and even 200 f It is preserving natural timber growth along highw and hopes soon to start an intensive program of planting. In a few previous instances it has bou land in the northern part of the State in order preserve standing timber along trunk line highway.

The Kent County, Mich., Road Commissio developing roadside tree planting and care and maintaining timbered county parks as tourist ca and roadside recreation centers. A county nurs supplies trees for planting both along the highw and in the parks. At present three parks wit combined area of about 102 acres are being maintai by the road commission.

Cooperative Fire Protection in Kentuck

Three cooperative forest protective associations under formation in Kentucky. About 400,000 a of forest land are represented by the 59 individ members. The work of protecting these lands fr fire is directed by the assistant State forester and district forester. Each protective area, which m be from 50,000 to 200,000 acres in extent and whic organized without regard to county lines, has a c warden in charge, with a number of deputy ward heading "registered crews" of volunteer fire fight

For the fiscal year 1927 the total funds for protection work, including the State appropriati Federal allotment, and contributions of landown amount to $23,700, or approximately one-tenth of amount estimated to be necessary for adequate tection. The counties do not contribute. E timberland owner is asked to contribute at least per cent of the expenditure for the protection of own lands.

Forestry Exhibit at Farm Show

A forestry exhibit by the Pennsylvania Departm of Forests and Waters at the Eleventh Annual Fa Products Show, held in Harrisburg in January, viewed by about 25,000 visitors. Orders were tal on the spot for 143,850 trees for planting this spri The 100 applicants included residents of 28 count The orders call for 65,450 white pine, 28,800 Nor spruce, 13,500 European larch, and smaller numbers red oak, Scotch pine, shortleaf pine, tulip pop pitch pine, white spruce, American elm, and h catalpa. An additional order was received for 1, each of white and red pine to be delivered in the spr of 1928.

Species Indicator for New York Tree Planters

A tree-planting indicator for New York State plant-rs was perfected by Clifford R. Pettis, superintendent f State forests, shortly before his death. The device, vhich resembles a photographic exposure chart, conists of a celluloid card about 3¾ by 2½ inches with movable disk in the center. Through its use the rospective planter easily learns which of eight forest pecies are recommended for planting in each of six vpes of soil for the production of saw timber, pulpood, or posts, poles, and ties. Inquiries in regard to btaining copies should be addressed to Whitehead & oag, 74 Chapel Street, Albany, attention of Mr. homas.

* * *

In the past 28 years 36,254,284 trees have been lanted on the State forests of Pennsylvania. This umber includes 21,417,427 white pines, 5,157,879 Noray spruce, and 3,476,004 Scotch pine. All but about per cent are conifers. The areas planted total 427.2 res. The cost of planting averaged $10.81 per acre d $8.59 per thousand trees. The number of trees anted annually was greatest during the period 1910–19, inclusive, reaching its peak of more than 6,000,000 the year 1918.

Young trees from the newly-established State forest nursery of Alabama were distributed in 1926 to 30 farmers in Bibb, Chilton, Shelby, and Perry Counties. It is the policy of the Alabama Commission of Forestry to issue to farmers without charge enough seedlings of suitable species to plant from one-half to 1 acre of ground, and to furnish planting stock in excess of this quantity at cost.

* * *

An education bureau has just been organized in the Georgia Forestry Department, with Bonnell H. Stone, chairman of the executive committee of the State board of forestry, as director. Definite funds have been budgeted for the purpose of publishing forestry educational publicity material and distributing it to teachers, civic clubs, etc., throughout the calendar year 1927.

* * *

A gift of $2,000 has been received by the Connecticut Park and Forest Commission from the White Memorial Foundation, through Alain C. White, for the purchase of additions to the Mohawk State Forest. This forest, made up mostly of gifts from the foundation, now has an area of 2,400 acres.

Education and Extension

esearch Professorship Endowed at Cornell

A research professorship in forest soils in Cornell niversity has been endowed by the Charles Lathrop ack Forestry Trust, a fund set aside for the advanceent of forestry by C. L. Pack and administered by s son Arthur Newton Pack as trustee. The endowent is $130,000, and additional funds have been given the trust for operating expenses of the investigations be undertaken. The work will deal primarily with chemistry and biology of forest soils and will be ne in the New York State College of Agriculture.

orestry Educators Confer at Philadelphia

The third annual conference of forestry educators, ld in Philadelphia December 28, 1926, brought gether members of the faculties of 12 forest schools. effort was made, through discussions in which the ool men were joined by members of the United tes Forest Service, to determine what changes uld be made in the forest school curricula to meet dern educational tendencies. The feeling was erally expressed that the curricula are already so crowded that additional subjects can scarcely find place. The members of the conference seemed to be agreed, however, that the schools can go farther in giving thorough training in undergraduate courses than they do at present. It was stated on behalf of the Forest Service that the service needs men well trained in the fundamentals rather than in the so-called practical subjects, and men who have been taught to think out problems for themselves. The civil-service examination for junior forester, through which 50 or more new men are chosen each year for Federal forestry work, was discussed at length.

Idaho Leases Arboretum Site

A 27-acre tract adjoining the campus of the University of Idaho has been leased as an addition to the university's forest nursery and arboretum. It will be used primarily to grow planting stock for distribution to farmers under the provisions of the Clarke-McNary law. The part not needed at once for this purpose will be used for the present to demonstrate methods of establishing and caring for farm woodlands and wind breaks.

Demonstration Forest Presented to New York State College

A recent gift to Syracuse University by the Charles Lathrop Pack Forestry Trust is a tract of timberland north of Glens Falls, N. Y., in the Lake George section of the Adirondacks, fronting on the Hudson River and extending more than two miles on each side of the main highway from New York City to Montreal. The property contains some fine specimens of virgin white pine. It is to be placed under management by the New York State College of Forestry as a demonstration forest.

Forest Protection Meetings in the Blue Mountains of Oregon

The forest-protection campaign carried on in Oregon during the past year by Hon. W. V. Fuller, representing the Western Forestry and Conservation Association, and George E. Griffith, of the United States Forest Service, in the fall reached the Blue Mountain region of eastern Oregon. There it penetrated the byways of the Umatilla, Wallowa, and Whitman National Forests and adjacent communities. The forestry films carried by the traveling lecturers were the first motion pictures some of the Blue Mountain children had ever seen.

Late in the winter Mr. Fuller and Ranger Albert Wiesendanger, of the Mount Hood National Forest, extended the campaign throughout Douglas County, in the southwestern part of the State, presenting programs of talks, motion pictures, and lantern slides at many schoolhouses.

Mississippi Schools Acquire Demonstration Plots

Ten agricultural high schools in Simpson County, Miss., have introduced forestry as a major study, setting aside plots of from 10 to 40 acres apiece for forestry demonstration purposes. County plans for 1927 include the laying out of these plots and the inauguration of the study of forestry by the schools and the 4-H Club boys under the supervision of H. C. Mitchell, extension forester. District Forester K. E. Kimball will be located in Simpson County and will oversee the study of these demonstration plots. As soon as the forestry work in Simpson County has advanced to the point at which it can be turned over to the local authorities another district will be selected for like intensive work, and so throughout the State.

* * *

An enrollment of 165 is reported by the College of Forestry of the University of Washington. This is about 10 per cent more students than were enrolled there last year.

Woods Work Now Required for Boy S Merit Badge in Forestry

By Ward Shepard, U. S. Forest Service

The requirements for Boy Scout merit badg forestry and conservation have been modifie accordance with suggestions of the United S Forest Service. The requirements that a scout now fulfill to win the forestry badge are as follow

1. Identify 25 kinds of trees when in leaf, o kinds of broad-leafed trees in winter.

2. Collect and identify 10 different kinds of and be able to tell some uses for each which he hi has observed.

3. Collect and identify seeds of 15 kinds of tre

4. Grow 10 seedlings of each of two coniferous two broad-leafed trees, from seed that he himself collected. Tell how the seed was collected, extra and planted.

5. Point out in the woods, or describe from obse tion, the damage that fire does to tree trunks, b roots, and seedlings (coniferous and broad-leafed).

6. Tell how to build a trench to stop a ground how to stop a surface fire; how to dispose of limbs other débris from timber cutting in order to re fire danger; how to locate a forest fire by triangulat

7. Lay off a plot of one-quarter acre in the w and tag all trees that should be cut in order t utilized and to allow the remaining trees to m better growth or reseed the area. Identify each and give the reason for removing or leaving it.

8. Present evidence that he has done somet specific in furtherance of forestry, such as—

(*a*) Planting 100 trees, preferably seedlings gr by himself.

(*b*) Thinning or "weeding" (cutting out worth or inferior trees) one-quarter acre of young or medi aged woodland.

(*c*) Helping to extinguish a ground and surface

(*d*) Collecting and burning 500 tent caterpillar masses.

To win the conservation badge a scout must fu the following requirements:

1. Know the principal natural resources of county and give the essence of any conservation l affecting them.

2. Know for his region the principal game bi animals, and fish, the seasons during which they protected, how they are protected, and the results protection.

3. Describe in detail one common game bi animal, and fish in his locality, and tell its habits living, feeding, and rearing its young.

4. Present at least two photographs taken by him showing some phase of conservation of natural resou and be able to describe the conservation involved.

5. Present evidence of having done some piece conservation work such as fighting a forest fire, che

ng erosion, planting trees, helping restock streams vith fish, posting or distributing conservation notices, lanting wild rice or other duck feed, feeding birds in vinter, or stopping stream and river pollutions.

6. Know in general the conservation laws of his State.

Possibly time will demonstrate that some of these equirements are too difficult, especially for the city cout. Their merit lies in stimulating personal observation and in teaching forestry and conservation as rafts to be practiced in one's own locality rather than merely as "book learning."

A Boy Scout Observance of American Forest Week

Extract from letter by F. A. Danton, Silver Fox Local Tribe, Lone Scouts, Cleveland, Ohio]

The tribe, after it had come to an understanding with he Forest Service on the observance of forest week, secured the cooperation of the Cleveland Public Library, vhich placed at our disposal an exhibit case and about 50 square feet of wall space in the entrance hall of the Hough Avenue branch. The Forest Service supplied s with bookmarks, two kinds of forest fire prevention osters, copies of the President's proclamation on merican Forest Week, and several hundred copies of overnment pamphlets for free distribution. For the ig feature of the exhibit, the tribe ordered one of the raveling photographic exhibits entitled "Our Forests—What They Mean to Us" and a set of 28 commercial ood samples. A few days before the opening of merican forest week, two scouts and the writer rranged the entire exhibit in the library.

The wood samples, which are labeled, were placed in ie exhibit case. Our wall space was evenly distributed ito four panels. Upon the first we posted, above the ye level, a placard which the tribe had printed bearing ie words: "Observe American Forest Week, Lone Scouts of America, Greater Cleveland."

Beneath this was posted a copy of the President's roclamation and next to it a letter from Gov. Vic Donahey. Below these two documents was placed the oster "Fire the Outlaw." Upon the remaining wall pace the photographic exhibit was tacked.

Two scouts were detailed to duty every evening uring forest week for the purpose of distributing the terature and explaining to anyone interested the hotographic exhibit.

It was estimated that over 1,000 persons viewed the xhibit during the week. This number includes only venings.

Two minor exhibits were held in the Superior Avenue nd East Seventy-ninth Street branch libraries. They onsisted of pictures clipped from forest publications nd mounted on cardboard and labeled, together with amples of wood, either gathered by the scouts or oaned by the Government, placed in an exhibit case.

Forestry Essays for Cash Prizes in Mississippi

High-school children of Mississippi have been trying hard during the past few weeks to state "the economic value of forestry in Mississippi." This subject was assigned them by the Mississippi Federation of Women's Clubs in a state-wide essay contest for which the State forestry commission donated prizes of $25, $15, and $10. Essays were limited to 1,000 words and a preference was stated for a length of from 500 to 800 words. Contestants were invited to apply to the State forester's office for forestry information, but were urged to introduce into their essays local material and original opinion. The names of the winners will be announced at the annual meeting of the State Federation of Women's Clubs, April 20–23.

* * *

Of the 93 foresters graduated from the University of California, 80 per cent are now engaged in forestry or closely allied work. This group, classified by Prof. M. E. Krueger, includes a few men who after completing most of the forestry courses were graduated from departments other than forestry. The present occupations of the 75 men in forestry or closely allied lines, as listed by Professor Krueger, are as follows: Forestry, 35; logging engineering, 9; graduate study, 7; forest products, 5; teaching (forestry), 2; grazing, 4; lumber business, 8; lumber journals, 1; miscellaneous allied lines, 4.

* * *

Nine thinning demonstrations were given this winter to farmers of Berks County, Pa., by the county agricultural extension association. At each meeting 50 trees were marked with numbers and when C. R. Anderson, extension forester of the Pennsylvania State College, had discussed the principles of thinning, each farmer listed the trees which he thought should be removed. The farmers' lists were graded according to Mr. Anderson's selection of trees to be cut and the one who made the highest score received a hand ax as prize.

* * *

Forestry extension work in Nebraska was initiated in 1926 by a committee appointed by the governor and headed by Director Brokaw, of the agricultural extension service. Evergreens from the Bessey Nursery administered by the United States Forest Service at Halsey and hardwoods purchased from the Arlington nurseries were distributed to the number of 33,000. The result is from 3 to 12 plantings to a county in three-fourths of the counties in the State.

Forest Service Notes

Fertilizing Value of Red and Jack Pine Leaf Litter

A ton of needles falls to the ground each year in red and jack pine forests of the Lake States, according to a study made by the Lake States Forest Experiment Station. The amount varies somewhat for different kinds of stands and for different-aged stands, ranging from 1,847 pounds for virgin red and white pine to 2,375 pounds for young jack pine, but hovers close to a ton to the acre each year. These needles contain many substances essential for plant growth, and the study was made to find out just what quantities of the different materials are given back to the soil each year by the forest.

To collect the leaf fall, burlap strips were laid on the ground in five different localities in red pine and jack pine stands of different ages and densities. This was done in the spring of 1925. In the fall of that year the litter on the strips was collected and was analyzed by the division of soils of the University of Minnesota. The final collection was made in the spring of 1926. The following figures show the amount of litter that fell during the year on one acre at each plot.

Amount of leaf litter falling on 1 acre in one year

Plot No.	Location	Kind of stand	Age	Amount of litter (oven-dry weight)
			Years	*Pounds*
1	Cloquet	75 per cent jack pine, 25 per cent red pine; density, 75 per cent.	50	2,104
2	do.	100 per cent red pine; density, 90 per cent.	100	2,192
3	do	100 per cent open-grown jack pine; density, 75 per cent.	30	2,375
4	Cass Lake	75 per cent red pine, 25 per cent white pine; density, 95 per cent.	200-250	1,847
5	do	100 per cent jack pine; density, 90 per cent.	55	2,373

The analysis of the needles collected in the fall of 1925 gave the following results for two of the plots:

Composition of leaf litter

Substances	Per cent of dry weight		Pounds per acre for one year	
	Plot 1	Plot 2	Plot 1	Plot 2
Ash	2.51	2.01	52.8	44.2
Nitrogen	.70	.42	14.7	9.2
Calcium	.74	.35	15.5	7.7
Phosphorus	.13	.11	2.7	2.4
Potassium	.12	.15	2.5	3.3
Sulphur	.24	.23	5.1	5.0

One of the most valuable constituents of the leaf litte is the nitrogen, which becomes available to plants in the form of nitrates if the litter remains undisturbed. Forest fires, when they burn the litter, drive off the nitrogen in the form of gas. The nitrogen is thus lost to the soil and the growth of the forest falls off. The nitrogen contained in the litter collected in a year on acre of red and jack pine forest could be replaced by about 70 pounds of sodium nitrate fertilizer, but this would cost in the neighborhood of $3.

The fertilizing value destroyed by a forest fire i greater than the value of one year's fall of needles because normally the forest floor bears the accumulated litter of three or four years. The actual loss in ground litter alone from a single fire in red and jack pine stands may easily be about $10 an acre.

The National Arboretum

By George B. Sudworth, U. S. Forest Service

A bill has been passed by Congress and signed by th President authorizing the appropriation of $300,00 for the purchase of land to be used in establishing a national arboretum within the District of Columbia. Such legislation has been sought for several years. The exact location of the arboretum has not yet bee determined, but it appears likely that it will include an area of about 350 acres lying along the Anacostia River, known as the Mount Hamilton tract. this bill originally passed the Senate it proposed to make the land available for park and recreation purposes. The House very properly eliminated these privileges. To leave them in the bill would have divided the administration of the tract between the Department of Agriculture and the War Department, to say nothing of attempting the impossibility of com bining recreational use with the orderly development of an arboretum.

The establishment of an arboretum at the National Capital is one of the most important accomplishments for forestry in recent years. From an educational point of view the benefits likely to accrue from it are immeasurable. Coming at a time when public sentiment is being aroused and concentrated on a nation-wide effort to increase timber production through practical forestry, the building of a national arboretum will give a most important stimulus to this movement.

The probable site of this arboretum combines topo graphic and soil conditions ranging from moist lowland to high dry uplands, which is an ideal combination. It happens also that climatic conditions in the District of Columbia, the natural meeting ground of iany different northern and southern species, will ermit the growing of an unusually large number of ative and foreign trees and shrubs. On this border ne between the North and the South there would em to be a greater opportunity for successfully tablishing a great collection of living trees than at most any other point in the country. The city of ashington already has more different trees growing ithin its environs than any other city in the country. s streets are adorned with more than 100,000 trees, d there are more than 600 different native and foreign ees growing in its public parks and other reservations.

In this connection should be mentioned the existence Washington of the United States Botanic Garden, many years' standing. Recently an act of Congress thorized an appropriation of $600,000 for enlarging d relocating this botanic garden. The funds when propriated will be used in acquiring land to the uth of the garden's present location at the foot of e Capitol, and in the erection of new conservatories.

At the present time there are but few outdoor collec-ons of trees in the United States. The Arnold Ar-oretum, established near Boston more than 50 years o, is the most notable for its great variety of native d foreign trees. Other collections of trees are the orton Arboretum at Lisle, Ill., the Marshall Arbore-m at Northfield, Ohio, the Missouri Botanic Garden St. Louis, the New York and Brooklyn Botanic ardens, the Rochester Department of Parks at ochester, N. Y., and the Letchworth Park Forest and oretum at Castile, N. Y.

laska Pulpwood Advertised in Two Largest Forest Service Sales

Two blocks of pulpwood on the Tongass National orest now being advertised for competitive bids are e largest timber sale offers ever made by the Forest rvice. Each of the sales is for 5,000,000,000 feet. e is near Juneau and the other near Ketchikan. A ndition of each sale is the establishment in Alaska a paper mill of at least 200 tons capacity. An vestment of at least $8,000,000 in water-power velopment, manufacturing plant, and logging equip-ent will be necessary in connection with each project. ve years are allowed for necessary engineering work d building the mill.

The lowest bids that will be considered are 60 cents r 100 cubic feet for spruce and 30 cents for hemlock lpwood. Bid prices will remain in effect until April 1942, and prices will be redetermined at that time d at intervals of five years thereafter on the basis of e actual current value of the timber.

Good water powers, which can be cheaply developed r grinding the wood into pulp, are available for each these timber sales, and the Federal Power Commis-n will advertise the power while the timber is being vertised, so that both the timber and the power rmit may be awarded to the bidder who offers the st terms.

The Alaska panhandle region has the timber and power resources for a perpetual industry producing at least a million tons of paper annually, and the Forest Service is planning for a permanent Alaska paper industry of this size.

Forestry Legislation, Second Session Sixty-ninth Congress

Some progress was made, but forestry did not fare as well in the second session of the Sixty-ninth Congress as it did in the first. The Woodruff-McNary bill passed the Senate in its original form but with an amendment by Senator Overman which would limit expenditures to those for the purchase of land on the headwaters of navigable streams, a restriction which would make section 6 of the Clarke-McNary Act a dead letter. When the bill reached the House it voted 340 to 15 to amend the measure by substituting the bill passed by the House April 7, 1926. The jam in the Senate, however, prevented action on the amendment.

Small additions were made to the Colville and Shoshone National Forests. The provisions of the general land exchange act were extended to areas adjacent to the Arapaho, Santa Fe, Harney, and Black Hills National Forests. A conflict in the provisions of the Weeks law was cured by amendment. The need for small nonagricultural home sites in Alaska was provided for by an amendment of the trade and manufacturing act. The boundaries between the Grand Canyon National Park and the Kaibab and Tusayan National Forests were adjusted. The embargo on the patenting of lands within the Northern Pacific Railroad grant was extended until 1928, with a request that the Attorney General advise Congress as to the legislative action that should be taken to settle the grant. The act authorizing the city of Boulder, Colo., to purchase 3,580 acres of national forest land within its watershed at a nominal price was the only adverse land legislation.

One interesting piece of legislation was the act presenting the New Mexico Agricultural College with approximately 50,000 acres of land adjacent to the Jornada Range Reserve, to be used in range livestock experiments.

Secretary Jardine Sets National Forest Grazing Fees

The Secretary of Agriculture has announced that there will be no change in fees for grazing on the national forests during 1927, but that the new schedule of fees recommended jointly by the Forest Service and Dan D. Casement, who at the Secretary's request investigated the methods of the Forest Service in appraising range values, will be put into effect on a graduated scale from 1928 to 1931, inclusive. One-fourth of the increases will become effective in each year of this period. The increases decided upon will be subject to such reductions as may be necessary to adjust the fees equitably among national forests or regions and among the various grazing allotments within each national forest. The new fees will remain in effect for the duration of outstanding 10-year permits, or to and including the year 1934.

By 1931 the average increase over present fees in the rate for cattle on all the national forests under this decision will be 4 cents per head per month, making the average fee 14.4 cents; for sheep the average increase will be about 45 per cent and will make the average fee 4.5 cents per head per month.

Forestry Increases in the Agricultural Appropriation Bill

The agricultural appropriation act for the fiscal year 1928 includes the following increases for Forest Service activities:

For fire prevention and presuppression	$77, 285
For additional personnel on timber sales	40, 000
For grazing administration	6, 000
For purchase of herd of long-horned cattle	3, 000
For new forest areas in the East	3, 742
Total for general expenses	130, 027
For establishing two forest experiment stations, in Pennsylvania and in the Ohio and Mississippi Valleys	60, 000
For naval stores investigations	5, 000
For forest products investigations	9, 736
For planting on the national forests	18, 300
For cooperation with the States in fire protection	290, 000

The forest road and trail item has been placed at $6,500,000, which is $1,500,000 more than the regular appropriation for 1927. The improvement appropriation has been increased $100,000 over the regular appropriation for 1927 for the construction of protection improvements on the four national forests in southern California. However, since a deficiency appropriation of $100,000 for improvements was granted in 1927 and was merged with the regular appropriation for that year, the amount of money actually available in the improvement item for the year 1927 is identical with that provided in this item by the act for 1928.

Fire Line Construction by Machinery

Successful experiments have been made on the Flathead and Shasta National Forests in the use of graders, plows, and tractors in constructing fire lines. On the Shasta plateau a single trip with a 5-ton road grader, 12-foot blade, drawn by a 10-ton caterpillar tractor through heavy manzanita, chinquapin, and snowbrush 3 to 6 feet high made a clean line 2½ to 3½ feet wide. The rate was about 45 minutes to the mile on a 5 to 10 per cent grade. A back trip over the same course gave a cleared line 4 to 5 feet wide. The two trip line reached mineral soil and was adequate for use in back-firing in most fires. A double round trip made an 8-foot motorway with reasonably smooth surface. Accumulations of brush had a tendency to hang up on the front edge of the blade, but by backing up a few feet and slightly changing the direction it was possible to free the blade.

On a hill of 36 per cent slope with numerous large loose rocks under the surface of the ground, the equipment running parallel to the slope and slightly downhill worked as well as on gentler slopes. There was no serious tendency to sideslip downhill.

A modified V-shaped drag 4 feet wide at the back, with sides 8 feet long, and weighing 4,600 pounds, was successfully drawn by a tractor through heavy brush, opening up a trail and pulling out most of the brush and roots. In most cases it did not eradicate the snowbrush, which has a tremendously powerful root system, but it was successful with the manzanita and chinquapin. A single passage opened a trail for a large crew to work from. A second trail was run parallel to the first with a crest 2 to 3 feet wide between. The grader was then run over the crest to shear it out and touch up spots missed by the drag. The result was a passable 8 to 9 foot motorway.

To brush out such a lane 8 feet wide by hand would cost not less than $125 a mile. To make by hand a line comparable to the one made by tractor and grader would probably cost not less than $400 a mile. With tractor, grader, and three-man crew the cost, at about $5 an hour, would be $20 a mile for a satisfactory motorway.

On the Flathead National Forest a trail has been made with plow and grader where the boulders were so numerous they almost hid the soil. In another instance 8 miles of trail were backsloped with the plow on hills that averaged from 30 to 90 per cent side slope. The start was made at a proper height above the grade stakes and a furrow plowed to give footing to the horse. Then by throwing the plow handles toward the bank it was possible to plow the backslope to the desired angle down to the level of the grade stakes. A round or two of the grader completed the trail. When not needed for grading the horse is used in clearing the right of way, particularly in pulling small stumps at a great saving over the cost of blasting.

Slash Disposal in the Southwestern Pine Forests

[Some results of studies by Junior Forester Arthur C. McIntyre on the Colorado Plateau in 1925 and 1926]

Piling and burning slash is the most effective method of reducing the fire risk following logging. In building a pile a heap of fine material should be put at the base and the large limbs placed on this with the curve of the limbs up. The finished pile should be conical with few large limbs on the outside to bind it together. large pile built this way can be burned with a foot snow on the ground.

Large piles 9 to 10 feet in diameter and 6 feet high ill take large limbs without cutting and so are more onomical than small ones. Location and weather ave more influence than size of piles on the damage reproduction or reserved trees caused by burning e piles. Two small piles containing no more brush an one large pile can not be so advantageously aced, and if they are burned simultaneously the heat ill probably be as great as that from a large pile. rge piles will burn during seasons when small ones ill not; they can be burned green; they take less ace; they cost less to build and burn; they give a tter clean-up; and if burned when there is little or wind they result in less damage.

Piling and burning is the most expensive method of sh disposal and when applied indiscriminately makes provision for the best silvicultural conditions or for otection against erosion. Piles that have been roneously located and left unburned do not rot adily, and remain a fire hazard for 30 or 40 ars. In places where piles can not be burned it is st to use some other method of disposal or leave e brush as it falls.

On heavy soils that bake, loose cinder soils, and soils that erode readily, and on areas that are heavily grazed, lopping and scattering is desirable. Lopped and scattered slash need not be made to lie close to the ground, as snow, decay, and trampling by stock bring this about in a few years. Where this method of disposal is used the area should be broken into blocks of about 80 acres each by piling and burning on fire lines.

The method used most extensively on the Colorado Plateau is pulling the brush. It is the least expensive form of disposal. With this method also the area must be broken into small blocks by fire lines on which the slash is piled and burned.

Snags on all cut-over areas should be felled. In doing this care should be taken not to block logging roads, which should be kept open as fire lines and as a means of quick access in case of fire.

* * *

The calf crop on the Santa Rita Range Reserve of the Forest Service, near Tucson, Ariz., for the past 10 years has averaged 73 per cent, as compared with about 55 per cent on surrounding unregulated ranges. Marketing data on 5,000 head of "outside" cattle show that they brought from $3 to $8 less per head than stock of the same ages raised on the reserve.

General Forest News

Third Pan-Pacific Science Congress

By L. C. Everard, U. S. Forest Service

om the report of W. C. Lowdermilk, delegate for the Society of American Foresters]

The third Pan-Pacific Science Congress, held in pan from October 16 to November 19, 1926, was ended by 414 Japanese delegates and 151 delegates presenting 15 other national groups on the Pacific. e attention of the congress was turned especially to eanography, geophysics, human geography and eth-ogy, fisheries, botany, and agriculture and forestry, hough about 400 papers were read covering a wide nge of scientific subjects. The question of slope tivation and erosion control came in for particular ention and the congress passed a resolution recom-nding that lands with steep gradients should not cultivated, particularly where scarcity of moisture l other factors prevent quick return of vegetation; l that a study be made to determine safe gradients cultivation, lands beyond such safe gradients to be ot under a "closed vegetative cover."

t was natural that the subject of erosion control uld have a prominent place in the discussion, not only for its importance generally but because the Japanese have for many years studied it intensively from both the engineering and forestry standpoints and have done some notable work in bringing back the vegetative cover on denuded slopes.

For instance, in the region about Mount Asama, an active volcano, the gradients are steep, valley walls at stream headwaters are not uncommonly 45°, the soil is soft and light volcanic débris, and the annual rainfall is 1,000 to 1,200 mm. Unregulated cutting of the forest (deciduous hardwoods) at the headwaters of the Kevezumi River to make charcoal led to washing and gulleying; the volcanic mud without forest cover to hold it was carried down to the valleys and plains and began to cover the rice fields; floods swept the villages, and damaged roads and bridges. About the year 1918 work was started to correct this. Cutting was stopped and made subject to approval by the forestry department. Dams were built, prostrate alder and grass were used for soil fixation, run-off channels paved with living sod nailed down with living cuttings of willow, plantations of conifers established, and by suiting devices to the features of the ground the erosion has been arrested and the headwaters of the river have been reclothed with a protective cover. In Korea the forest experiment station at Seoul is making intensive investigations of less expensive erosion control methods. A method tried there is to terrace on 5-foot contours with a small horizontal shelf and build a low sod wall, pull down soil from the slope above and pack it in behind the sod wall, and plant seeds of Japanese alder (*Alnus firma* varieties) and *Pinus densiflora* in this soil shelf until vegetation establishes itself. Grass sod dams are also built in the small run-off channels and shrubs and trees established in the soil accumulation behind these dams. Of the shrubs used *Lespedeza bicolor* may be mentioned; the seed of this shrub were mixed with earth from pea fields to inoculate the roots with nitrifying bacteria before planting behind the dams. Other planting materials used for temporary cover are *Pinus thunbergii, Robinia pseudoacacia* L., *Alnus japonica* S. et L., *Salix japonica* Thunb., and other *Salicaceae.*

"The experience of Japan is that a barren or eroding catchment basin of the short rivers yields more sudden and disastrous stages of high water than similar watersheds covered with forest vegetation. The comparative influence of a forested and excessively eroding watershed is not a debatable question in Japan. The Japanese engineers and foresters, unlike those of some western countries, are in agreement on this point. It is not a question of the influence of forests on stream flow, it is rather how shall barren eroding lands be restored to a cover of forest vegetation. The disastrous experiences in the narrow valleys from angry flood waters issuing from eroding catchment areas have been costly instructors. The maintenance of watersheds in a mantle of forest vegetation has proved to be the most economical policy in the control of flood waters.

"Dikes are built in the alluvial plains to protect adjoining fields from inundation and submergence with sands. They are considered essential, even as the mantle of vegetation is considered necessary. Japanese engineers and foresters have progressed beyond a controversial stage to one of cooperation in control of the natural resources of vegetation, soil, and water."

The Japanese Government as host of the congress overwhelmed the delegates with unprecedented hospitality and consideration. In preparation for the excursions to be taken guidebooks had been written especially for the delegates by specialists in geology, botany, zoology, and history. These books, containing the information which the visiting scientists wanted most, were presented to the delegates. Also railway passes for Japan and Korea, hotel accommodations, meal tickets, and even passes on the Tokyo electric lines were a part of the hospitality, to say nothing of the entertainment of a more formal nature.

The Japanese put the cap on their hospitality by making English the official language of the congress, out of consideration for the fact that it was the language of a great many of the visiting delegates from various national groups.

In the resolutions of the congress attention was called to the fact that native fauna and flora of the oceanic Pacific islands are rapidly vanishing, and it was urged that systematic collections of both plant and animal species be made before it is too late. Economic development of the islands and introduction of domestic animals and plants were given as the causes of the dying out of endemic fauna and flora. Among the subjects given major attention at the congress were the preservation of original flora and fauna of scientific interest—particularly those of the Juan Fernandez Islands, which are of peculiar scientific interest—and of remarkable geological formations; collection and publication of surface temperature readings from ships in the Pacific; cooperative study of volcanology; geodetic investigations with the aid of submarines; cooperation in daily charting of the meteorology of the world; studies of the mineral resources of the Pacific region; research into the configuration of the ocean floor; study of physical and chemical oceanography and marine biology; surveys of known and probable enemies of crops and promotion of protection against them; and slope cultivation and erosion control.

The congress formed a permanent organization known as the Pacific Science Association and accepted the invitation of the Government of the Dependencies of the Netherlands to hold the fourth congress in Java in 1929.

American Forestry Association Meeting

The American Forestry Association at its annual meeting held this year at New Haven, Conn., on January 28 and 29, voted to support adequate fiscal programs for Clarke-McNary cooperation in fire protection and for the purchase of lands for national forests east of the Great Plains. Hon. George D. Pratt, president of the association, in speaking of the Clarke-McNary law, laid stress upon the point that the principle of cooperative effort "must meet the test of accomplishment." "The experience of the Federal Government itself," he said, "has shown that inadequate appropriations for fire prevention too often result in far more expensive outlays to extinguish fires which might have been prevented. * * * My own association believes that Congress should make available at least one million and a half dollars annually, if it is to be in a position to meet its own assumed obligations in cooperative fire protection and to exercise leadership in a national forest policy which it has initiated as the will of the people."

In speaking of the purchase of lands for national forests he said, "The danger here lies in the public and political demand that the small amount of money made available for the work annually be spread over the much greater area coming under the enlarged authority of the Clarke-McNary Act, thereby dissipating the funds available for completing acquisition projects already tarted. * * * The permanence and success of his act are all important to forestry in the United States. Failure of any one of the three agencies, State, rivate, or Federal, and most particularly the last, to lo its part means a setback that will undo much of our orest progress during the past decade."

The association also voted to support forest research n a scale commensurate with the importance of our ational timber problems.

Robert B. Goodman, former chairman of the com- ittee on economics of the National Lumber Manu- acturers' Association, in an address on "Where will he lumberman get his future supplies?" called atten- ion to the change in the relationships between the restry profession and the lumberman. "The timber wner," said Mr. Goodman, "is looking to the forester, hom he formerly mistrusted as an economic enemy, s his economic adviser."

E. A. Sherman, associate forester of the United tates Forest Service, in speaking on "The sunny side f conservation," said: "The evidence of the economic isaster confronting our Nation and the magnitude of e task involved in the conservation and restoration f our forests has, I fear, made forestry somewhat of bugbear. I want to urge that henceforth we preach e blessing of new and better forests, industries stored upon a permanent basis, the landscape beauti- l arising from the ashes of the landscape desolated, permanent population with money in the bank and nfidence in the future. * * * It seems to me at henceforth there are three aspects to the forest roblem that may well receive your special emphasis. irst, to bring the people to realize that expenditures r forest protection and production increase our tional wealth and tend to reduce the national burden on industry; that such expenditures are an exceed- gly safe and profitable investment, and that every llar thus taken from the National Treasury will be paid with a cash profit in addition to collateral ad- ntages even more important to industry and to cial progress. Second, it is an investment perma- ntly enriching the immediate region where expended. hird, the beauty as well as the utility of our forests s a real value measurable in dollars and cents in that makes the country more attractive for the habitation man and adds materially to the sale value of every re of land within the radius of its influence."

Will C. Barnes, of the United States Forest Service, inted out in his address on "The romance of the ass lands" that since the first conservation congress 1908 the preservation of our national grazing lands the public domain had been constantly discussed t that nothing had ever been done about actually tting these lands under management that would aintain their productivity and carrying capacity. To-day," said Mr. Barnes, "this country has nearly 0,000,000 acres of strictly grass lands, lands which der no known system of cultivation can ever be ed for any other purpose than the grazing of livestock. An area larger than Texas and which at a value of even $2 an acre means over $300,000,000 worth of public property is lying idle and deteriorating in usefulness—a liability rather than an asset."

In describing the way in which range management was developed on the national forest ranges, Mr. Barnes called attention to the fact that "no nation had ever before undertaken such a task as regulating the use of over 150,000,000 acres of forest lands by about 14,000,000 head of cattle and sheep of all ages." There were no precedents; the work was pioneer work. It was done with an uncommon amount of sympathy for the stockmen and understanding of their problems; indeed, it was directed in large measure by stockmen who had left their flocks and herds to enter the Government service. Mr. Barnes gave it as his opinion that "the majority of livestock permittees using the grazing lands on our national forests are willing to admit that their industry must be secondary to the primary purposes for which the forests were created—timber production and watershed protection."

Vice President Rice, of the New York, New Haven & Hartford Railroad, in an address on "The railroad man's interest in forest conservation," said that his company uses 82,000,000 board feet in ties each year, of which all but 12,000,000 feet is grown in southern New England and eastern New York.

Other addresses made at the meeting included:

"Public aspects of State forestry," by F. W. Luening of the Milwaukee Journal.

"What forestry means to the South," by Miss Martha Berry of the Berry Schools of Georgia.

"Chemical possibilities in wood utilization," by Carlile P. Winslow, director of the Forest Products Laboratory.

"Making wood last longer," by Grant B. Shipley, president of the Century Wood Preserving Co.

"Conservation of wild life and waste land," by Hon. F. C. Walcott, chairman of the Connecticut Commission on Forests and Wild Life.

"A rational wild plant conservation program," by Dr. Albert F. Hill of Yale University.

"Importance and methods of preserving wilderness conditions," by Dr. Charles C. Adams, director of the New York State Museum.

"The weather man as a forest fire fighter," by Dr. Charles F. Marvin, chief of the United States Weather Bureau.

"Some neglected values in New England," by A. M. Turner of the Connecticut State Park and Forest Commission.

Addresses on forestry in New England in relation to pulp and paper, industrial development, and stream pollution were made by Forrest H. Colby, former forest commissioner of Maine; John S. Lawrence, president of the New England Conference; and William R. Copeland, of the Connecticut State Water Commission.

Addresses were also made by President Emeritus Arthur T. Hadley, of Yale University; Henry S. Graves, dean of the Yale Forest School and president of the Connecticut Forestry Association; and Lieutenant Governor Brainard.

The attendance was more than 300. Inspection trips to the collections in the Yale School of Forestry and Peabody Museum of Natural History, and to the New Haven Progress Exhibit, and a field excursion to the forestry operations of the New Haven Water Co., were a part of the program.

The meeting was a joint meeting of the American and Connecticut Forestry Associations, and in conjunction with the general sessions were held special joint meetings with the Connecticut Botanical Society and the forest firewardens of Connecticut, and special meetings of the New England section of the Society of American Foresters and the Forestry Association Secretaries' Club.

Canada Takes the Lead in Newsprint Production

World leadership in newsprint manufacture in 1926 went to Canada, according to the News Print Service Bureau. In that year the United States, which in 1925 had a slight lead over Canada, increased its output by 10 per cent; but the Dominion shot ahead with an increase of 24 per cent. The figures given by the bureau are: Canada, 1,882,000 tons; the United States, 1,687,000 tons. Newfoundland, with a gain of 93 per cent over its record of the preceding year, produced 186,000 tons in 1926.

Of the record-breaking Canadian production 88 per cent was imported into the United States. With this huge addition to the domestic output, practically all of which was kept within the States, and other imports totaling 193,140 tons, the United States accounted for 56 per cent of the world consumption of newsprint in 1926. Overseas importations to the United States showed a decline, as they have done each year since 1923.

The per capita consumption in the United States, according to estimates of the News Print Service Bureau, in 1926 reached the remarkable figure of 58 pounds. The increase over the 52 pounds per capita consumed in 1925 is said by the bureau to be due to growth in both the size and the circulation of newspapers. In 1926 the newspapers of the United States carried 5 per cent more advertising than ever before, added still more special features and special sections, and increased their Sunday circulation by 5 per cent and their daily circulation by 7 per cent.

⁂

Black walnut is bringing $40 to $100 per thousand board feet on the stump in the good walnut section of Ohio, Extension Forester F. W. Dean reports. A single 30-inch tree which scaled well over 1,000 feet was sold by a farmer in Logan County for $150.

McSweeney Introduces Comprehensive Bi for Forest Research

The most comprehensive single bill dealing wit forest research that has ever been presented to th Congress of the United States was introduced o March 3 by Representative John McSweeney, of Ohi at the request of the National Forestry Program Com mittee. This bill (H. R. 17406) carries out, with min modifications, the recommendations made by a speci committee of the Washington section of the Societ of American Foresters in a report entitled "A Nation Program of Forest Research." It is intended codify and round out Federal legislation on fore research and to authorize appropriations large enoug to permit satisfactory development in this field duri the next decade.

The McSweeney bill covers the forest research of t Forest Service, the Bureau of Plant Industry, t Bureau of Entomology, and Biological Survey, a the Weather Bureau, and would provide for appropri tions for this work totaling $3,465,000. It woul authorize the Secretary of Agriculture to carry investigations to determine the best methods of refores ation and of growing, managing, and utilizing timbe forage, and other forest products, of protecting fores from all harmful agencies, of managing wild life, and maintaining favorable conditions of water flow a preventing erosion; and to determine the econom considerations underlying the establishment of sou forest policies. It would provide for studies of fores tree diseases, of fungi causing decay in wood and oth forest products, and of injurious and beneficial fore insects; studies of the relationship of weather conditio to forest fires; and investigations into the life histor of forest animals and birds. Under its terms t Secretary of Agriculture would be authorized to devel improved methods of range management consiste with the growing of timber and the protection of wate sheds. Provision would be made for investigations the Forest Products Laboratory and elsewhere in t utilization and preservation of wood and other fore products. Finally, it would authorize a comprehensi survey of present and prospective requirements lumber and other forest products, existing timber su plies, and the present and potential productivity forest lands; also investigations of timber-growing cos and returns and of the possibility of profitable forestr in the various forest regions, with the purpose of brin ing about the profitable use of land and the effecti distribution of forest crops.

An important specific provision of the bill wou direct the maintenance of the 11 regional forest expe ment stations already established or authorized and t establishment of 1 additional station in the continen United States and 1 each in Alaska and the We Indies. This would mean one station for each of o major forest regions.

The Increasing Average Haul of Lumber

By Robert V. Reynolds, U. S. Forest Service

The average rail haul of lumber from place of manuacture to place of use has practically doubled in the nited States in 10 years. Estimates by the Forest ervice for 1923 and 1924 place it at 725 miles and 700 iles, respectively, whereas a 1914 estimate placed it at 60 miles.

The apparent decrease of 25 miles in 1924 may be ithout significance, or it may be an indication that he increasing cargo shipments of North Pacific softoods to the Atlantic coast have cut down the average ail haul to that extent. The estimates of the average ail hauls of the lumber-producing regions in 1923 are s follows:

umber transportation: Estimated average length of rail hauls, 1923

Region	Inbound (miles)	Outbound (miles)
ortheastern	840	180
ake	910	415
entral	890	405
orth Carolina pine	300	360
outhern pine	250	685
acific (North)	255	1,275
acific (South)	560	775
ocky Mountain (North)	420	850
ocky Mountain (South)	820	610
rairie	1,515	300
United States average	725	725

Relative length of haul is a factor of great imortance in the rivalry between lumber-producing gions, such as the present competition between ouglas fir and southern pine for the markets of the ortheast.

With an average rail haul of 1,275 miles North acific softwoods appear to be hopelessly handicapped s against southern lumber with an average haul of 85 miles. The Northwest is 85 per cent farther from s market than the South. The average rail freight harges, however, do not increase proportionately with he length of haul, being in this instance only about 60 er cent greater for Douglas fir than for southern pine. he average charges per thousand feet are approxiately $9.35 for southern pine and $14.85 for Douglas r.

The difference of $5.50 per thousand in favor of the outh has not proved an insuperable obstacle to the est, which with the aid of lower production costs nd water transportation continues to invade the ortheastern market successfully.

Here it should be observed that averages do not tell e whole story, as rail charges to New York are $12.38 r softwoods from the Gulf States and $22.23 for ftwoods from Portland and Seattle. The South, owever, has an advantage in that it can reach all arts of the northeastern territory by rail without extending its present average haul or increasing the charge per thousand. On the other hand, most advances made hereafter by the West into new market territory in the East will result in extreme hauls at extreme rates and will tend to cause the western averages, both of hauling distance and charge per thousand feet, to rise rapidly. There are many important internal sections of the country which under present conditions can be served only by rail traffic and which will become increasingly dependent upon softwoods from Washington, Oregon, and British Columbia as eastern and southern supplies decline.

Chinese Elms on the Northern Great Plains

By F. E. Cobb, State Forester of North Dakota

Mr. Woodbridge Metcalf's account, reported in the November number of the Forest Worker, of the successful growing of the Chinese elm in California leads me to write of the growth of this importation on the northern Great Plains.

In the spring planting seasons of 1918 and 1919 more than 3,000 2-year seedlings of this species were received at the Northern Great Plains Field Station at Mandan, N. Dak., where I was then acting in charge of the tree work. These were sent out to 18 selected farmers for trial.

In 1925 while doing some work at Cornell University I sent these farmers a questionnaire in regard to these Chinese elms, and received 16 replies reporting very satisfactory results. After seven growing summers, more than half during drought years, the surviving stand averaged 92 per cent. Only 3 of the 16 farmers reported any winter or drought injury. Three reported injury by insects including the spiny elm caterpillar, blister beetle, and grasshopper; and one wrote that his planting had been killed outright by rabbits. Others reported injury by hail, sleet, snow, wind, and cattle. The height growth reported compares very favorably with that of the California plantings described by Mr. Metcalf, averaging 14 feet. The maximum growth was 19 feet and the minimum growths, which occurred in a section of Montana where drought was particularly severe, were 5 and 8 feet.

Height growths of 24 and 25 feet have been recorded for this species in both Montana and North Dakota. In six experiments on dry-land field stations of the Bureau of Plant Industry in the Great Plains region (Texas to Montana) an average growth of 14 feet and a maximum growth of about 24 feet were reported. On three irrigated plantations in Montana, South Dakota, and Nebraska the average growth was 21 feet and the maximum about 24 feet.

In the spring of 1924 an abundance of seed of the Chinese elm was obtained in certain localities of North Dakota. One farmer, having picked a larger quantity of this seed than he cared to plant, thoroughly dried the remainder, placed it in a cereal carton with a closed cap, and set it away. In January, 1925, he tested some and found it viable, and in March he sent about six ounces to me at Ithaca. In April, 1925—one year after it was picked—this seed was used to plant a 4 by 12 seed bed in the Cornell forest nursery. It came up well, giving a very satisfactory, even stand. The seedlings grew from 3 to 6 inches the first year. In the spring of 1926 1,600 of them were sent to the State forest nursery at Bottineau, N. Dak., and planted there. The stand when dug in the fall of 1926 showed an average survival of 92 per cent and had attained an average growth of 2 feet.

The Chinese elm has two serious drawbacks. One is that of susceptibility to mechanical injury in high winds, especially when pruned. The other is its very early flowering habit. It often flowers in February in Texas and in April in North Dakota. In either location such early blossoms are almost certain to be killed by frost. An important point in favor of the tree is that it is a strong surface feeder and so is able to make use of small amounts of moisture falling as light showers. Also, it will sprout from injured or cut roots, although only slight success has been obtained in rooting either green or dry cuttings. It has proved itself a species of outstanding value for the semiarid regions of the Great Plains. We are planning to raise a quantity of trees of this species at the State forest nursery of North Dakota for general distribution in the State.

Press and Fire-Protection Men Get Together at Tacoma

A fire-prevention meeting held on February 16 by the Chamber of Commerce of Tacoma, Wash., brought the press and the fire protective associations of the Northwest face to face with each other's troubles and points of view. The 80 or 90 men present included the presidents of three transcontinental railroads, the State foresters of Washington and Oregon, the State land commissioner of Idaho, and representatives of the chambers of commerce of Tacoma, Seattle, Portland, and Spokane and of the Portland Oregonian and Journal, the Seattle Times, and the Tacoma papers, the American Lumberman, the Timberman, the West Coast Lumberman, the Four L Lumber News, the Western Forestry and Conservation Association, local forest fire protective associations, and the United States Forest Service. A prearranged series of talks in which public education in forest fire prevention was a leading subject was followed with reports by a committee on policy and a committee on educational publicity.

The definite piece of work which the conference adopted as its own is an effort to have every chamber of commerce in the Northwest appoint a forest fire prevention committee and set it working along lines suggested by State forest protective associations or State foresters.

The conference will meet again in 1928 and, witho forming an organization, will be continued as long it seems to be needed.

Ten Commandments of the Trail

HENRY WELLINGTON WACK

[By permission of the author]

First.—Use the By-Ways—not the Highways.

Second.—Don't go Walking to beg a Ride. Th auto-riding Hiker is a Fraud.

Third.—Everything belongs to Somebody. The respect all Private and Public Property. Be not th Author of its displacement, disfigurement, or disap pearance.

Fourth.—Keep off Prohibited Ground. Neither fis nor hunt on Posted Land. Trespassers create ba will toward all Nature Lovers, Campers, and Sport men.

Fifth.—Leave Gates, Fences, Signs, Stakes, growin grain, and crops as you found them. Walk aroun never across, all planted fields.

Sixth.—Pluck no Wild Flowers—they belong to al Leave them for all to enjoy. Pick no cultivated frui Resist the boyhood call of the Melon Patch.

Seventh.—Clear away twigs, leaves, and pine needl down to moist earth, before laying a Camp Fire foot square. Keep cook fires low, and less than on fifth the size of the clearing. Large fires preven cooking, but destroy forests. Only small fires a safe, quick, and comfortable to cook with. Put cam fires out with water, not with a kick. See that th peat or humus around the fire is not burning under ground to destroy the woodland after you have lef A single spark may fly a hundred feet and burn million trees. Arson is no greater crime than stupid or neglect on the Trail.

Eighth.—Leave camp sites clean; burn all garbag replace cut firewood and supplies found in camp You are the Guest of an absent Host—not the vand of a present opportunity. Leave a note of thanks i a wilderness shelter you have used. Put in ord before you depart.

Ninth.—Silence, or speech in whispers, is the sig of trail experience and good woodsmanship. Onl fools and asses bray in a Forest.

Tenth.—When you leave a beautiful Woodland descend from a Mountain, stop, turn around, and ga reverently awhile. Then thank God for the boon o Forests are to all mankind. Treat Life's Trail r sponsibly and keep it clean. To the seeing eye an the generous soul, Nature's beauty—her mysteri and charm—forever call us to her Trails.

* * *

Frederick, Md., has recently purchased about 3,00 acres of timberland on its watershed. The city alread owned a protection forest of 2,000 acres.

Foreign Notes

Forest Farms in England

By W. N. Sparhawk, U. S. Forest Service

Beginning in 1919, the British Government had up o the end of 1925 acquired for reforestation purposes pproximately 30,000 acres of sandy land in three units n Suffolk and Norfolk. These areas include considerble arable land; and a large number of farmhouses nd cottages, including at least one entire village, vere acquired along with the lands. The farms had ong been deteriorating, many of them were abandoned, nd the whole district was in a bad way. It was soon ound that a good supply of local labor was essential o do the planting and other forest work, and in 1925 he scheme of forest workers' holdings was put into ffect.

The more fertile lands have been classified and ivided into units of approximately 10 acres, and a ouse with necessary outbuildings is being provided for ach unit, either by repairing existing structures or by uilding. The occupants, who are carefully selected rom a waiting list, pay 5 to 10 shillings ($1.25–$2.50) n acre annual rental for the land, and 6 per cent of he cost for buildings. The forest department guaranees them 150 days' work a year at current local vages, and also hires their teams and plows for plantng work, for making fire lines, and for hauling. They re encouraged to raise vegetables, small fruits, poulry, and pigs, for which there is a good market fairly ear. According to the plan there will ultimately be bout five of these small farms for each 1,000 acres of orest plantations, i. e., a maximum of 5 to 8 per cent f the total area will be used for agriculture. The arms are to be well distributed over the forests in roups of three or more, so as to avoid loss of time in oing to and from work and to afford a maximum egree of protection.

So far the work has consisted chiefly in establishing 6 acres of nurseries and in preparing the ground, encing, and eradicating rabbits. About 12,000 acres vere planted during the first seven years, and planting s now proceeding at a rate of more than 3,000 acres a ear. It is expected that thinnings will be begun in rom 10 to 12 years and will furnish firewood, fencing, nd other material, and that a few years later the cuting of mine props will furnish an increasing demand or labor. As timber becomes available, various woodsing industries will be established.

On the 20,000-acre unit known as Thetford Chase 56 ettlers have already been established and some 350 ersons were given part-time employment during the all and winter of 1925–26. The population of the State-owned village of Santon Downham, which had been almost deserted, has increased from 50 to over 200.

Australia Establishes a Forestry School

A forestry school for the Commonwealth of Australia was first suggested at the Interstate Forestry Conference in 1911. Although the proposal was greatly favored, nothing came of it until 1925, when C. E. Lane-Poole was appointed forestry adviser to the Commonwealth Government and a central school was temporarily established at Adelaide University under the professorship of N. W. Jolly. Adequate funds have now been provided and a central forest school is assured. Buildings are now being erected at Canberra and will be ready for occupancy some time during the year. The location of Canberra is fortunate, since the school will have immediately at hand probably one of the best conifer arboretums in Australia and will be within 3 miles of forest plantations now amounting to 1,000 acres.

Forestry in Czechoslovakia

One-third of all the land in the Republic of Czechoslovakia is forest land, 46,628 square kilometers out of a total of 140,394. More than 220,000 people are engaged in forest activities including activities connected with game and fish. The most important timber is spruce, of which there are 1,196,382 hectares in pure stands. There are 486,720 hectares of pure pine stands, more than 600,000 hectares of mixed coniferous growth, chiefly fir and larch, and 1,274,000 hectares of hardwoods, chiefly beech and oak.

National forests amount to more than 700,000 hectares and communal forests to more than 430,000 hectares.

More than 74 per cent of the total forest land of the republic is under administration; and of the large forests in Bohemia, Moravia, and Silesia, as distinguished from what the Czechoslovakian foresters call "small parcels," more than 96 per cent of the area is under administration. In Slovakia and the Subcarpathian Province more primitive conditions prevail.

The total wood production of Czechoslovakian forests is about 15,000,000 cubic meters annually. Other products that appear in the forest statistics of the Republic are tanbark from oak and spruce amounting to 456,000 hundredweights and leaf litter amounting to 448,000 hundredweights. Something over 10,000 kilograms of naval stores are produced.

The Republic maintains 62 forest nurseries, for which it appropriates about 2,000,000 crowns a year.

Czechoslovakia has very ambitious plans for the development of forest research. A separate "institute" has been established for each branch of forestry, including silviculture, mensuration, economics, products, entomology and pathology, and forest soils. The entire organization is still in a formative stage, and comparatively little field work has yet been possible. Perhaps the greatest progress has been made in studying forest soils, with particular reference to the relation of their chemical properties to tree reproduction and growth.

Soutrage

By W. N. Sparhawk, U. S. Forest Service

"Soutrage" is a short French word meaning "the removal of leaf litter from the forest." M. Delevoy, chief of the research division of the Belgian Forest Service, has recently reported the results of experiments that demonstrate clearly the evil results of this practice.

Five sample plots were established in a Scotch pine forest and studied for 21 years. One was a check plot; on one the litter was removed every year; and on a third the litter was removed annually, but mineral fertilizer was added every third year. The fourth plot was stripped of litter every third year, and the material taken from the three plots was scattered over plot 5. The stand was 50 years old at the time of the last measurement, in 1919.

Measurements of the volume showed that annual removal of the litter resulted in a loss of 17 per cent in the current annual increment, equivalent to a deficit of 1½ cubic meters per hectare per annum (21 cubic feet per acre). With removal of the litter once in three years, the loss was slightly less. Although the addition of fertilizer reduced the loss in growth to some extent, the saving was not sufficient to make it worth while. The extra accumulation of leaf litter on the fifth plot led to an increase in growth of 16 per cent over the check plot (20 cubic feet per acre per annum).

In a 28-year-old stand of beech, with a slight mixture of oak, birch, and larch, nine plots were established in 1897. On one the litter was removed annually and on another every three years. On the third plot both litter and leaf mold were removed every three years, and the fourth was treated in the same away except that fertilizer was added. On the fifth and sixth plots the soil was dug up with mattocks every three years, fertilizer being added on the sixth. On the seventh the rows between the trees were cleared out every three years and the loose earth scattered over the ground. The litter from plots 1 to 4 was scattered over plot 8. No. 9 was a check plot.

Volume measurements in 1910 and 1919 showed a diminution in current annual increment of 21.2 per cent, or approximately 2 cubic meters per hectare (28 cubic feet per acre), on the plot from which the litter was taken annually for 22 years. Where it was remov once in three years, the loss was 16.3 per cent (21 cub feet per acre per annum). Removal of the leaf mo with the litter reduced the growth by 34.6 per cent, approximately 49 cubic feet per acre per annum, a where mineral fertilizer was substituted the loss w about one-half as large. The various methods cultivation, as well as the addition of litter, increase the growth by about 6 per cent, or approximately 1 cubic feet per acre per annum. (From Bulletin Société Centrale Forestière de Belgique, October, 1926

University of Toronto Gives Extension Course in Forestry

The University of Toronto through its departmen of extension is offering a correspondence course i elementary forestry. The 30 lessons of the course de with tree identification and the relationships of tree and forests to environmental factors; forest conditio with reference to present and future supplies; method of obtaining natural regeneration; methods of planting wood utilization; and logging methods. The cour does not lead to any formal certificate or degree, an there are no academic entrance requirements.

* * *

The woodlands section of the Canadian Pulp an Paper Association has decided to engage a fores engineer to carry on investigative work in connectio with logging operations and woods management. Th man to be employed will be known as the technica secretary of the section and will be responsible to the secretary manager of the association. Through activities of its woodlands section the association ai to lessen the cost of delivery of pulpwood from stump to mill, by developing improved methods of logging, and to bring about the adoption of forestry principl in the management and administration of timb holdings and timber operations.

* * *

Imports of western red cedar into New Zealand totaled 6,500,000 feet in 1925 as compared with only 1,350,000 feet in 1924. They continued to grow in 1926, amounting in the first three months of the year to 1,932,000 superficial feet as against 908,000 in the corresponding period of 1925. Western red cedar i valued in New Zealand because of its lasting properties. Although it can not stand so long as the native matai, it is easier to nail.

* * *

Lumber exports from the Port of Montreal to t United Kingdom decreased in 1926, the year of t British coal strike, by 11,628,000 board feet. The decrease was from 57,572,000 board feet in 1925 to 45,944,000 in 1926.

Personals

Paul G. Redington has been appointed chief of the reau of Biological Survey, to succeed Dr. E. W. lson. In this change the United States Forest vice loses a man not only distinguished in his pro- sion but exceptionally popular both in the service with the public. Mr. Redington entered the vice in 1904, immediately after graduation from the e Forest School. After serving on many national sts of the West, in 1916 he became district forester he Southwestern National Forest District, and from 9 to 1926 he was district forester of the California rict. In the spring of the latter year he took charge he public relations work of the Washington office he Forest Service.

. Y. Stuart, until recently secretary of the Pennsyl- ia Department of Forests and Waters, has returned he United States Forest Service, succeeding to Mr. lington's post as chief of public relations. Mr. art was graduated from the Yale Forest School in 6 and entered the Forest Service in that year. er six years' service on the western national forests oined the Washington staff as inspector of national st timber sales, and later he took charge of the re western division of this work. In 1917 he was oughed for military service in France with the th Engineers. He became deputy commissioner of stry in Pennsylvania in 1920, and had full charge restry work in the State, as secretary of the depart- t of forests and waters, throughout the administra- of Gifford Pinchot as governor.

harles E. Dorworth has received appointment to cabinet of Governor Fisher, of Pennsylvania, as etary of the department of forests and waters. Dorworth has since 1909 been editor of the Belle- e (Pa.) Republican.

epresentative Gordon Lee, of Georgia, has resigned the National Forest Reservation Commission, and been replaced by Representative S. D. McReynolds, ennessee.

rover M. Conzet has been reappointed for two s as commissioner of forestry and fire prevention of nesota.

illiam G. Howard has been appointed superintend- of State forests of New York, succeeding the late ord R. Pettis. Mr. Howard was formerly Mr. is's assistant.

layton W. Watkins has been appointed forestry nsion specialist in Nebraska. Mr. Watkins is a uate of the Colorado Agricultural College and was erly a ranger on the San Isabel National Forest,

Tom Gill has become forester for the Charles Lathrop Pack Forestry Trust. His work for the trust will consist largely in the preparation of books and articles on various phases of forestry. Half of his time during the next three years will be devoted to a tropical forest survey under the direction of the Tropical Plant Research Foundation, to which the Pack forestry trust has donated funds for this purpose. The object of this work will be to identify the more important tropical species and to determine their amount and availability and their potential influence on forest supplies and forestry practices in the United States and other countries. Field work will begin in November of this year, probably in the countries of the Caribbean region. Mr. Gill was for 12 years a member of the United States Forest Service, and for the past year has been associate editor of American Forests and Forest Life. He visited the Tropics in 1923 as a member of the first aerial timber-estimating expedition to Mexico, and in 1925 was sent by the Tropical Plant Research Foundation to make a survey of forest conditions in eastern Cuba.

C. F. Evans, of the Intermountain National Forest District, has been appointed to the new Clarke-McNary inspectorship with headquarters at New Orleans. He will inspect the cooperative work under the provisions of the Clarke-McNary law in Florida, Alabama, Mississippi, Louisiana, Texas, and Oklahoma.

Prof. R. S. Hosmer, of Cornell University, and Dr. J. C. Kendall, of the New Hampshire Agricultural Experiment Station, have been reappointed for a period of four years as members of the Northeastern Forest Research Council. Members newly appointed are S. H. Thomson, president of the Federal Land Bank of Springfield, Mass., and Blaine S. Viles, State forest commissioner of Maine.

Charles J. Kraebel has returned to the United States Forest Service as silviculturist, California Forest Experiment Station. Mr. Kraebel, who is a forestry graduate of the University of Michigan, entered the service in 1916 as ranger. After serving as forest assistant and forest examiner he went to Hawaii in 1920 as assistant State forester. In 1924 he joined the National Park Service, from which he has now resigned as superintendent of the Glacier National Park.

Roscoe Weaver has been given charge of the Devil's Canyon nursery of the California Forest Experiment Station, opened on January 1. Mr. Weaver has previously been employed by the United States Forest Service, the Philippine Forestry Bureau, and the California State Board of Forestry.

Kenneth Pearce, of the 1921 class of the College of Forestry of the University of Washington, has been appointed chief forest engineer for the Madras Presidency, Madras, India. Mr. Pearce will be responsible for the operation of five sawmills and connected operations, and for all domestic export log and lumber sales from government forests and mills. His head assistant will be Jack Wernham, also a graduate of the Washington school.

K. E. Kimball, district forester of the southeastern district of North Carolina, has been appointed to assist the State forester of Mississippi.

Arthur C. McIntyre is leaving the United States Forest Service, after two and one-half years' service as junior forester on the Coconino National Forest, to undertake work in forest planting research at Pennsylvania State College.

Everett E. Stanford has been promoted to the position of chief assistant forester of Los Angeles County, Calif. His work includes the operation of a nursery, reforestation, roadside planting, insect control, mistletoe eradication, and research.

Aubrey H. MacAndrews has succeeded the late Prof. Edwin A. Hartley in the department of forest entomology of the New York State College of Forestry. Mr. MacAndrews was graduated from the college in 1925, and spent the past year in graduate work at the University of Minnesota.

Burnett Sanford has become forester for the Sugar Pine Lumber Co., of California, which has a mill near Fresno and large camps 60 miles distant in the Sierra. Mr. Sanford was formerly connected with the Madera Sugar Pine Co.

E. W. Hadley, who until a few months ago was assistant silviculturist of the Southern Forest Experiment Station, has resigned his position as assistant State forester of Georgia. Mr. Hadley and his brother, W. C. Hadley, have gone into private consulting work as forest engineers, with headquarters at Brunswick, Ga.

Francis H. Eyre has reported at Washington as assistant in the office of forest experiment stations, United States Forest Service. Mr. Eyre was graduated from the University of Michigan in 1922 and since then had served continuously in the national forests of the intermountain district, recently as assistant supervisor of the Wasatch Forest.

Charles Edgar Randall, jr., has been appointed to the Washington staff of the United States Forest Service for work in the preparation of press material. After graduation from Leland Stanford University Mr. Randall went to Oregon Agricultural College as a teaching fellow in botany, and later he served nearly three years with the Bureau of Plant Industry in blister rust control work. He has had several years of newspaper experience in Washington and elsewhere.

Edwin Jahn, of the 1925 class of the New Yo State College of Forestry, has been awarded a fello ship in McGill University, established for the purpo of carrying on a study in cellulose chemistry.

Allen Thompson, resident forester of the city Seattle, has been granted a year's leave of absence continue his forestry studies at Yale. Mr. Thompso was graduated from the College of Forestry of t University of Washington in 1924.

R. F. Taylor, technical assistant on the Tonga National Forest, is spending the present school ye at the Yale Forest School studying plant ecolog research methods, and forest management.

Harold J. Lutz, after graduation from the Ya Forest School in June of this year, is to join the sta of the Connecticut Agricultural Experiment Statio at Storrs, Conn. He will be employed chiefly research work in forest ecology in connection with t forest-soils project now under way there. Mr. Lu was graduated from the Michigan State College 1924 and was for two years a technical assistant on t Chugach National Forest, Alaska.

George D. Pratt has been reelected president of t American Forestry Association, and George O. Va treasurer.

Officers elected by the Society of American Foreste in December to serve for one year are: Presiden R. Y. Stuart; vice president, R. T. Fisher; secretar J. H. Fahrenbach; treasurer, S. B. Detwiler. Ald Leopold was elected to the executive council of t society for a term of five years. New officers of se tions of the society are as follows:

Ohio Valley Section—chairman, Charles C. Dea secretary, Burr N. Prentice; member of executive co mittee, E. V. Jotter. Allegheny Section—chairma F. W. Besley; vice chairman, John F. Preston; an secretary-treasurer, H. F. Round. Wisconsin Se tion—chairman, C. V. Sweet; secretary, F. G. Wilso California Section—secretary, F. S. Baker.

Officers elected in February by the Marylan Forestry Association are: President, DeCourcy W Thom; vice presidents, G. M. Gillett, Mrs. Jas. H Dorsey, C. R. Disharoon, J. Harris Franklin, and H Arthur Stump; and secretary-treasurer, W. McCullo Brown. Directors elected at the same time are Mr Albert Sioussat and H. S. Clopper.

Officers elected by the Pennsylvania Forestry Asso ciation to serve during the year 1927 are: President Dr. Henry S. Drinker; vice presidents, Robert S Conklin, J. Freeman Hendricks, Mrs. David Reeve and Samuel L. Smedley; general secretary, Samue Marshall; recording secretary and treasurer, F. L Bitler.

Bibliography

Bibliography of Tropical Woods

A publication that should be of the greatest value to eryone interested in the forests and forest products the Tropics, and especially Latin America, is the Bibliography of the Woods of the World, with Emasis on Tropical Woods," recently prepared by orge P. Ahern and Helen K. Newton of the Tropical ant Research Foundation. This bibliography, which s prepared for the Research Committee of the erican Society of Mechanical Engineers, is a revision d extension of the previous compilation by Professor cord of the Yale Forest School. Of the 1,341 titles, proximately half deal with tropical America.

Valuable features are the index to special woods and bjects, and the key letters indicating the places ere most of the references can be consulted. Of the t edition, which is mimeographed, only a small mber of copies was prepared. It is planned to issue nore complete edition (probably printed) some time 1927, and supplementary lists annually thereafter.

The compilers are desirous of receiving corrections d additions from anyone who may care to offer them. ggestions should be sent to Maj. George P. Ahern, opical Plant Research Foundation, 1350 B Street ., Washington, D. C.

Forest Fires in Maine

This report, prepared by Forest Inspector C. R. lotson under the provisions of the Clarke-McNary , deals particularly with conditions outside the ine forestry district. Within the forestry district, which 10,000,000 acres are forested, the State has an cient organization of chief wardens, deputy wardens, rolmen, and fire-lookout observers. A system of 68 kout stations and a telephone system are constantly ng added to and improved. Although improvents could be made in the system inside the forestry rict, no attempt is made to outline them in view of outstanding need outside the district, which is not ng satisfied.

Outside the forestry district the suppression of forest s and law enforcement in regard to them are praclly dependent upon the town officers or upon uty fire wardens whom the town officers are authord but not obliged to appoint. Although this has antages if the town officers are interested and cient, it does not work out well on the whole.

The important measures recommended in the report as follows:

1. The forest commissioner should have authority, upon petition or upon his own volition, to designate fire districts in which forest fire control will be handled by the State. One-half the expense of suppression should be charged back against the town or county.

2. Provision should be made by law requiring motor vehicles to be equipped with permanently fixed devices for holding burnt matches and burning tobacco.

3. The system of fire observation stations should be extended.

4. Poor towns should be assisted in the purchase of forest fire fighting equipment. The State should also maintain at one or two centrally located points fire pumps for loan to towns hard pressed by fires.

5. If legal authority exists, the State should take over the job of apprehending and prosecuting violators of the forest fire laws in the towns.

6. The State nurseries should be increased in size, or provision should be made with commercial nurseries to supply small trees at a reasonable cost.

7. More stress should be laid upon educational efforts, particularly in the schools and boys' and girls' camps.

"Investigation into the Progress of Height Growth of Trees"

The results of a study of tree growth conducted over a period of 27 years at the Swiss Forest Research Institute at Zurich have just been published by Dr. Hans Burger. In all some 194,100 measurements were made on 2,912 plants growing in three localities. The more important of Doctor Burger's conclusions as reported in the Indian Forester for December, 1926, are as follows:

Height growth in a given year is less closely related to the weather conditions in that year than to the reserve food supplies accumulated during the previous year, although the duration of height growth is dependent upon the weather of the current year. Height growth depends largely upon locality (this influence being more pronounced in hardwoods than in conifers), varies with age, and is greatly influenced by the source of the seed. Few species, apparently, are able to utilize the full climatic possibilities of the growing season.

The progress of height growth during the growing season closely parallels the temperature curve, rainfall affecting it irregularly and only through influence on temperature—except, perhaps, in dry years. Neither amount of sunlight nor atmospheric humidity affects rate of growth, except as it affects temperature. Over any extended period, growth is less affected by external influences than by the characteristics of the individual species.

Nature Study Program

Facts about nature and suggestions for nature activities for every day in the year are given in a new publication entitled "A Nature Almanac for 1927," by William G. Vinal, of the New York State College of Forestry at Syracuse. Every community of 25,000 population or more should have a nature program, according to Doctor Vinal, and it should be a year-round program, with a competent nature guide for a leader. He gives suggestions in regard to starting such a program and putting it into successful operation. The book is a mine of practical and interesting information and suggestions, and is printed on opaque, white paper that makes it pleasant to handle and to read.

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Ecology, Oct., 1926.—Some relations of plant ecology to silvicultural practice, by Carlos G. Bates, pp. 469–480.

Forstwissenschaftliches Centralblatt, Sept. 1, 1926.— Die ergebnisse langfristiger ertragsoersuche, by Gerhard Reinhold, pp. 628–642. Nov. 1, 1926.—Zur frage der erziehung junger fichtenbestände, by Josef Bohdanecky, pp. 777–783; Dec. 15, 1926.—Der wuchs der eiche in abhängigkeit von dem gewicht der eicheln.

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Farmers' Bulletin 1517, Loblolly Pine Primer.

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Map Folders: San Bernardino; Sierra; Angeles; Umatilla—South Half; Chiricahua National Monumen Central Appalachian National Forest Motorways.

National Forest Administrative Maps: ¼ inch, Flathead, Florida, Fremont, Montezuma, and St. Joe; ½ inch, Beaverhead, Cache, Kaibab, and Washakie.

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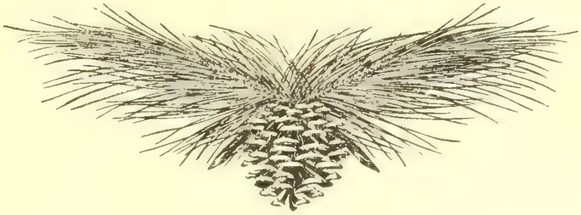
FOREST WORKER



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Announcements

Commercial Forestry Conference

A conference on commercial forestry is to be held by the United States Chamber of Commerce October 18, 19, and 20 of this year, probably in St. Louis. It will be attended by representatives of the wood-using industries and of chambers of commerce and trade organizations throughout the country.

Old Timers' Reunion at Bessey Nursery

The twenty-fifth anniversary of the establishment of the Nebraska National Forest and the Bessey Forest Nursery is to be celebrated at Halsey, Nebr., June 4 and 5. Men who were connected with the forest and the nursery in the early days will hold a reunion, and will be joined by others who have been interested in the development there of the first continuous planting project ever started on the national forests.

Forester Wanted for Boys' Camp

A forester qualified to teach forestry and nature study in a boys' camp is needed this summer by the C. E. Cobb Camps, Denmark, Me. One or two assistants with forestry training may also be needed to act as counsellors.

British Empire Forestry Congress

The next British Empire forestry congress is to held in Australia and New Zealand in 1928. The co mittee on arrangements has suggested the attenda of some 32 members from parts of the Empire otl than the two commonwealths directly concern Features of general interest will be discussions of t Imperial timber supply and consumption, research silviculture and products, forest management, and t formation of an Imperial forestry bureau to serve a general clearing house for information.

Journal of Forestry to Omit Current Liter ture Section

The section on "current literature" in the Jou of Forestry is discontinued, beginning with the issue, because the cost of printing has been found be disproportionate with the number of readers int ested. Hereafter this list will be distributed in mim graphed form by the Forest Service. Copies will sent regularly to those asking to have their nam placed on the mailing list.

Because the edition of this periodical is necessarily limited, its free distribution outside of the Government service is restricted to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

Material offered for publication in the Forest Worker should be addressed to the Editor, U. S. Forest Service, Washington, D. C.

FOREST WORKER

Washington, D. C. MAY, 1927 Vol. 3, No. ~~[illegible]~~ 3

State Forestry

Legislative Developments

Delaware.—A State forestry department is to be eated in Delaware, under the provisions of an act proved April 25. A nonsalaried State forestry comission of four members is to be appointed by the vernor for terms of 2, 4, 6, and 8 years, respectively, e full term of members appointed after the comission is established being set at 8 years. The comission is to employ a technically trained State forter, who will hold office at its pleasure and at a salary ed by it. Financial support of the State forestry partment is authorized to the extent of $5,000 a year.

The State forester is to "devise and promulgate, th the approval of the commission, rules and regulaons for the enforcement of the State forestry laws d for the protection of forest lands; direct the imovement of State forest lands; collect data relative forest conditions and become familiar with and quire into the locations of all timber land and cuter lands and prepare maps showing the locations d areas of State forests and privately owned forests, far as available funds will permit; take such action is authorized by law to prevent and suppress forest, ush, and grass fires; enforce all laws pertaining to rest and brush-covered lands and assist in the osecution, in the name of the State, of violations of id laws; cooperate with the land owners, counties, d others in forest production and reforestation; d publish such information on forestry as he deems nducive to promoting the objects of this act. He all act as secretary of the State forestry commission d prepare annually a report to the commission on e progress and conditions of the work of the State estry department, giving recommendations for imoving matters of forest production, management, roduction, and utilization within the State of laware."

The law provides for cooperation with the United ates Government under the Clarke-McNary Act, d authorizes the State forestry department to enter o cooperative agreements with private agencies for e prevention and suppression of forest fires. It thorizes the department to produce forest planting stock and to distribute it at the cost of production, packing, and transportation. It also provides penalties for injury to or removal of trees and shrubs growing upon the land of another without the owner's written consent.

South Carolina.—A forestry bill has passed both houses of the Legislature of South Carolina and has been approved by the governor. This measure provides for the creation of a State forestry commission and for the employment of a State forester. It carries no appropriation.

Minnesota.—Under a new law of Minnesota, an owner of land suitable for forest purposes may have it listed as an "auxiliary State forest" and enter into a contract with the State whereby the land while undergoing reforestation will be taxed at 8 per cent of one-third of its true valuation. The owner's plan of silvicultural treatment must be approved by the commissioner of forestry. The maximum contract period is 50 years, but contracts may be renewed. Commercial forests being developed under reforestation contracts will be subject to an additional tax of 3 cents an acre for fire protection purposes. When the timber is cut a yield tax of 10 per cent will become due.

Other acts of the Minnesota Legislature recently approved set aside as a State forest 80,000 acres of State land within the limits of the Minnesota National Forest; direct the commissioner of forestry to classify and list all State-owned lands suitable for reforestation; and create an interim commission of 13 members to study the question of restoration, delinquent real estate taxes, and finances of counties and taxing districts in the forest areas of the State and report recommendations to the next legislature.

Utah.—Utah has taken a step toward developing an organization for handling forest fires, in an act signed by Governor Dern on March 14. This act authorizes the boards of county commissioners to designate as fire districts all or any parts of the watersheds within their respective counties, directing that notice be given by publication of the creation of such fire districts. Any fire within such a fire district that burns growing trees, shrubs, brush, grass, undergrowth, or cultivated crops without adequate and proper precautions having been taken to prevent its spread is declared a public nuisance. Any person responsible for the starting or the existence of such a fire is required to make an effort to control or extinguish it immediately. If he does not so control or extinguish the fire, the sheriff of the county or any of his deputies, or such other officer or officers as the county commissioners may designate, are directed to do so, employing such persons and means as seem expedient and necessary. The person responsible for the starting or existence of the fire is made liable to the county for the expense incurred by the county in extinguishing or controlling it. The act defines as a misdemeanor the negligent or willful setting on fire, causing or procuring to be set on fire, or exposing to danger of destruction by fire, of any growing trees, shrubs, brush, grass, undergrowth, or cultivated crops, on any lands not one's own property.

Montana.—An act of the Legislature of Montana approved in March declares any uncontrolled or spreading fire in forest material between May 1 and September 30 a public nuisance, and holds the owner of the property on which such fire exists or from which it spreads responsible for controlling and extinguishing it. If the owner does not make a reasonable effort to do this the State forester, the United States, or any forest protective association recognized by the State forester may proceed to control or extinguish the fire and collect the costs from the owner. An owner listing his lands with a forest protective association or with the State forester or the United States Forest Service is considered to have taken reasonable steps to control and extinguish fires.

A permit is required for the burning of any forest material during the period May 1–September 30, and in addition it is required that anyone setting a fire in that period provide himself in advance with fire-fighting equipment and tools, take reasonable precautions, and watch the fire until it is out. Violation of these provisions is made punishable by a fine of from $25 to $500 or by imprisonment of from 10 to 90 days, or both. The State forester or any State forest officer may refuse or revoke a permit at his discretion, and the governor upon the advice of the State forester may suspend any or all permits.

Anyone clearing right of way for any railroad, highway, trail, etc., is required to pile and burn all slashings unless exempted by the State forester. Neglect to do this is a misdemeanor punishable by a fine of from $100 to $1,000, and in addition an offender may be enjoined from proceeding with the work of clearing.

In connection with timber cutting it is required that slash be disposed of to the extent and in the manner required by the State forester, with the provision that expenditures need not exceed 15 cents per thousand board feet of merchantable timber cut. In the event of failure to remove slash the State forester may have it removed and collect the cost of removal, up to the same limit plus 10 per cent.

A further provision of the act permits the Sta board of land commissioners in its discretion to li any of the State's forest lands with any qualifi timber protective agency.

California.—A recently enacted law of Californ calls for the creation of a department of natural r sources, headed by a director of natural resources, whi will take over the duties of the mining bureau, depar ment of petroleum and gas, board of forestry, Redwo Park Commission, and other organizations of th State government. The new department will consi of divisions of mines and mining, forestry, parks, an fish and game. The division of forestry will have its head a technically trained State forester nominat by a State board of forestry consisting of seven mem bers appointed by the governor. Of this board o member shall be familiar with the pine-timber i dustry, one with the redwood industry, one wit the livestock industry, and one with the problem of water conservation.

Nevada.—An act of the Legislature of Nevad approved in March, authorizes sheriffs and the deputies, fire wardens, other peace officers, and an national forest officer to call upon able-bodied me within the State between the ages of 16 and 50 yea for assistance in extinguishing timber or brush fire No one is to be required to fight fire for a total more than five days during any one year. Me drafted to fight fire are to be compensated at a rat fixed by the board of county commissioners. Refus to obey the summons is made a misdemeanor punis able by a fine of from $15 to $50 or imprisonment a county jail for from 10 to 30 days, or both fine an imprisonment.

This act authorizes the board of county commi sioners of any county to employ one or more wardens, who are to be compensated for time actual spent in fire fighting at a rate to be set by the boar of commissioners. The fire warden is to be und the direct control of the sheriff. If the area to b protected lies near to or within a national forest, h may be placed under the direction of the fores supervisor.

New Hampshire.—The forest fire statutes of Ne Hampshire have recently been amended so that an person causing or kindling a fire without suitab permission is liable to the town for any expense i curred in attending or extinguishing the fire. This in addition to the provisions of law previously in effe making such a person liable to fine or imprisonme and damages. It is required that before a fire built on private land belonging to another permissi be obtained from the owner, agent, or caretake and that except when the ground is covered with sno no fires be kindled in or near woodlands where the may communicate with woodlands, without the wri permission of the forest fire warden. The warden permission is not required for building camp or cookin fires if the landowner's permission has been obtain nd city or town regulations require no other permit; ut these fires may be kindled only at suitable times nd in suitable places where they will not endanger oodlands, may be ordered extinguished by the warden he deems them contrary to this provision, and must totally extinguished before being left.

Violation of this law is punishable by a fine of not ore than $500 and imprisonment of not more than e year, or both.

New York.—A resolution introduced in the New ork Legislature by Senator George L. Thompson and ssemblyman Clarence L. Fisher seeks to amend the ate constitution so as to authorize the State, in ses of emergency, to contract debts for the purpose suppressing forest fires. Formerly, under section 53 the conservation law, if the conservation department certified that available funds were inadequate for otecting the forests from fire the State comptroller s authorized, subject to the governor's approval, to ake a temporary loan to the department for that rpose. A recent opinion of the attorney general ld this law to be unconstitutional. Since then the gislature has found it necessary to appropriate nually for forest fire suppression more money than needed in the average year, and there has been no ovision for obtaining additional funds for this purse in the intervals between legislative sessions.

Crown Point and Ticonderoga, Essex County, N. Y., ve been added to the list of Adirondack "fire towns." is brings them within the area over which the State nservation department exercises authority with gard to forest fire protection. Both towns include nd owned by the State as part of the forest preserve.

New Jersey.—The New Jersey Board of Conservaon and Development under recent legislation is powered to create special fire districts, which may clude one or more townships or parts thereof, and to point fire wardens for service in these districts. All e-fighting costs incurred by these wardens and their sistants in such districts are to be borne by the ate. This makes it possible for the board to supplement the township and district fire organizations here they are inadequate. These organizations are pported one-half by the State and one-half locally.

North Carolina.—The forest protection laws of North rolina have been so amended that forest officers may w require a citizen to assist in fighting a forest fire tside the township in which he lives.

A $2,000,000 bond issue has been authorized by the neral Assembly of North Carolina to make possible establishment of a national park in the Great oky Mountains.

Tennessee.—A bond issue of $1,500,000 to make ssible the establishment of a national park in the eat Smoky Mountains is authorized by a recent act the Legislature of Tennessee.

Vermont.—Vermont has appropriated $24,500 a ar for general forestry and $8,000 a year for State est purchase and reforestation in each of the next two fiscal years. These amounts represent increases of $2,000 and $6,000, respectively. A resolution adopted by the Vermont Legislature provides for a commission of conservation and development, which is to study the State's forestry and game situation and work out a policy for its scenic and recreational development. The five members will include the commissioner of forestry, the fish and game commissioner, and three persons to be appointed by the governor.

Indiana.—Taxpayers of Indiana are hereafter to pay 1 mill a year on each $100 worth of taxable property for State forestry purposes. The levy was previously one-half mill.

New Mexico.—The constitution of New Mexico has been amended so as to permit of the exchange of State land in national forests for Federal land.

Town Forests in Massachusetts

Seventy-eight Massachusetts cities and towns, or more than one-fifth of all in the State, have voted to establish municipal forests. The land dedicated to this purpose amounts to nearly 10,000 acres. Most of these towns were able to establish forests without making special purchases of land: About 25 per cent of them are using land contained in their poor farms; 25 per cent more received land for forestry purposes by gift; and from 10 to 15 per cent have applied forestry management to town-owned watersheds. Thus the amounts that the towns have been obliged to appropriate in making themselves forest owners total only $76,000.

Into the development of these 78 community forests has gone the planting of more than 1,250,000 trees. For several years the Massachusetts Forestry Association has been offering to plant 5,000 trees without charge for any town in the State establishing a forest of 100 acres or more, and 29 towns have accepted this assistance.

In encouraging a town to possess itself of a forest, the Massachusetts Forestry Association usually begins by suggesting to the selectmen that it be put to a vote in town meeting whether a committee shall be appointed to investigate the possibility of establishing a town forest. When an investigative committee is appointed the association urges it first to find out whether the town already owns any land, such as a watershed, a poor farm, a wild park, or tax land, that can be adapted to the purposes of a town forest. If no such land is discovered the committee is advised to determine whether any local citizen is willing to donate land of suitable type. The next recourse suggested is an appeal to private citizens for funds for the purchase of land, and as a last resort an effort is made to have public funds appropriated.

Though the general plan is based on the New England form of town government, it might be applied almost anywhere.

Unusual Town Forestry Work of Richmond, N. H.

The town of Richmond, N. H., this spring has made a remarkable offer to nonresident owners of land within its boundaries whereby they can have their land reforested with no trouble to themselves and at cost. At the request of an owner to the selectmen his land is inspected, and if it is found suitable for reforestation the selectmen proceed to plant it. When the work is completed the owner receives a bill covering the bare cost of planting stock and labor. A fund of $500 was set aside by the town to finance this plan.

Ralph L. Morgan, of Richmond, is doing a very distinctive piece of work in the effort to transmit to his townsfolk his own enthusiasm for forest planting. This winter he published a series of very attractive illustrated leaflets presenting the local possibilities for profitable forestry. The climax of his arguments was the offer to furnish planting stock from his private nursery, free of charge, to any resident of Richmond or any nonresident owning property in Tully Valley north of the Massachusetts line. In Mr. Morgan's nursery, begun in 1924, more than 300,000 3-year-old transplants of red and Scotch pine, spruce, and white pine have been prepared for planting this spring.

Town forests in New Hampshire now number 61 and have a total area of 11,643 acres and an estimated value of $328,000. Some towns have retained their forest lands from the charter; Newington, for instance, has held title to its lands since 1710. This spring three towns accepted gifts of land for town forests, three others made appropriations for town forest purposes, and eight appointed committees to investigate the matter of acquiring forests.

First-Year Results of Cape Cod Experiment

The Cape Cod experiment in fire protection through public education and patrol has had a distinctly successful first year, according to Wm. A. L. Bazeley, Massachusetts commissioner of conservation. The number of forest and grass fires that occurred on the cape during 1926 was in fact 138 as compared with an average of 73 for the preceding three years; but this increase was due largely to land-clearing operations connected with a boom in Cape Cod real estate, which brought in great numbers of strangers unfamiliar with the unusual fire hazard on the cape. In area burned over the gains for fire protection are clearly shown; during the period 1923–1925, fires had covered an average of 9,363 acres a year, but in 1926 the area burned over was only 3,771 acres. During the earlier years the cost of fire suppression averaged $9,829, and in 1926 the combined cost of educational work, patrol, and suppression was only $12,452. Thus through an expenditure of one-fourth more the area burned over was reduced to two-fifths of the averag and this in a year of exceptionally bad fire condition

The campaign on Cape Cod was undertaken by tl Massachusetts Forestry Association with the cooper tion of the Massachusetts Department of Conservatio the United States Forest Service, and the forest wardei of the six towns of Cape Cod. At the beginning 1926 Arthur M. Cook, forester of the association, mac a three months' speaking tour of the cape. Mr. Coo went before all the schools, clubs, boards of trade, an similar organizations, taking with him fire-preventio films and bulletins. The local press, railroads, electri power companies, and manufacturers joined in th campaign. As one result of the educational wor 120 miles of old public and logging roads were brushe out, at the joint expense of the Massachusetts Forestr Association and the towns. Two men familiar wit the district were placed on duty as forest rangers, eac equipped with a small truck fitted for fire fighting; an throughout the fire season these men patrolled th roads of the cape, kept camp and picnic grounds an town dumps under inspection, supervised brush burr ing, distributed printed matter, reported fires and the causes, suppressed small fires, and kept the subject fire prevention constantly before the public.

County Forestry in Los Angeles in 1926

The Los Angeles County Forestry Department i 1926 collected more than 1,000 pounds of tree seed principally of big cone spruce and California walnut and more than 8,000 pounds of chaparral seed, mo of which was of wild cherry. In the Altadena nurser there were growing during the year 860,708 trees, o which 841,659 were Coulter pine. Other species rai included eucalyptus, and torrey and digger pines An additional 17,000 trees were being raised on Grizzl Flats, close to the place where plantings are to be mad A definite campaign was continued during the year t free some of the trees in and around the forest park of Los Angeles from mistletoe, 351 trees being treate or cut down. Firebreaks with a total length of 48 miles were built, in 14 different projects, and an approximately equal mileage of old firebreaks was cleaned. During the year 159 miles of roadsides were cleared of grass and inflammable débris. Other work done and supervised by the department included the planting and trimming of thousands of roadside trees and the clearing of many lots.

Georgia Landowners Organize for Fire Protection

Fifteen groups of Georgia landowners have organi within the past year to cooperate with the State forest protection. The three largest of these timber-protective organizations are the Towns-Union, of about

,000 acres, the only one in the northern part of the te; the Homerville, of 200,000 acres, in which Alex Sessoms is active; and the Suanee River, of 250,000 es, of which I. F. Eldredge is superintendent. arly all the members of the organizations have pted the plan of cutting their forest land into blocks h firebreaks. Several hundred miles of firebreaks, m 10 to 100 feet in width, have been built within year, almost entirely by the use of machinery such tractors and plows.

eld Station for Fire Experiments in Maine

new station for forest fire experiments is to be ned this year near either Ashland or Millinocket, northeastern Maine, by the Maine forest service the Northeastern Forest Experiment Station of the ted States Forest Service. It will have a staff of men, and will be equipped with instruments for determination of precipitation, air pressure, air perature, air humidity, wind movement, evapora- n, duff and soil temperature, and duff moisture. effect of weather conditions on the inflammability various forest fuels will be studied with the object determining what danger of fire is brought about different forest types, and in different conditions in se types, and in different conditions in these types, any given combination of meteorological factors. er studies will be made in an effort to determine relative dangerousness, in different forest types and ditions and in different kinds of weather, of various brands from cigarette stubs to camp fires.

Quarantine Against Ribes

quarantine for the protection of white pine against ter rust was declared February 15 by Conservation mmissioner Alexander Macdonald, of New York. order forbids the bringing in, planting, possession, propagation of any species of currants and gooseries, including flowering currants. It applies to the rondack and Catskill parks and to other specified s where protective measures against blister rust e already been put into effect or are to be applied. violation of the order is made a misdemeanor.

Vrmont Farmers Get Low Prices for Christmas Trees

bout 2,000,000 Christmas trees were shipped from mont in 1925 and an equal number in 1926, accordto estimates of the Vermont Forest Service. The mont farmers who raised these trees, cut them, and vered them at the railroad siding received an aver- price of 25 cents a bundle (one to six trees, according to size) for trees that retailed in large cities at from $5 to $10 a bundle. "If a farmer has a long haul to the railroad," says R. M. Ross, commissioner of forestry, "it means that he gets wages for himself and team and that is about all. In other words, he gives his trees away in order to get the job of hauling them to the railroad."

Bus Drivers Report Fires

School bus drivers of Gloucester County, Va., whose routes reach three-quarters of the county, have an agreement with Chief Warden Walker to watch for forest fires. During the dangerous fire season it is part of the routine of every school day for drivers who have seen fires to report them at the county courthouse.

The Connecticut Department of Forestry has an arrangement with the New England Transportation Co. whereby the company's bus drivers are instructed to watch for forest fires and when they see fires to report them to the department at once. This means that 500 miles of territory are patrolled every day of the week. The New England Telephone Co. has agreed to put through the drivers' fire reports without charge to the State.

* * *

At town meetings held in March, 4 Vermont towns authorized the establishment of town forests, 5 provided for additional plantings on forests already established, and 3 appointed town forest committees. Plantings on the forests of 17 municipalities of the State this year are expected to total 267,000 trees.

* * *

The Texas Forest Service has placed under administration the State forest near Conroe, Montgomery County. This forest, containing 1,633 acres, was cut over a few years ago, but enough seed trees of loblolly pine remain to reforest it naturally. It is planned to use this area to demonstrate woods management to farmers and other timberland owners. Only such measures will be adopted as can be put into practice by the private owner. The area will also be used for forestry experiments.

* * *

The Texas Forest Service recently completed on the State forest near Kirbyville what is "probably the first commercial planting of pine seedlings in Texas." The plantation includes 56 acres of longleaf pine, 5 acres of loblolly pine, 1 acre of shortleaf pine, 3 acres of slash pine, and 1 acre of redwood. One-year-old seedlings were used. The pines had been grown in the State forest nursery, and the redwoods were obtained from the Pacific Coast Lumber Co. of California.

Georgia's first State forest has just been established on 16 acres of virgin hardwood forest land in Union County, on the Blue Ridge Mountain divide. The tract was given to the State by the Pfister & Vogel Land Co.

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The woods of Massachusetts were closed on April 14, by order of the governor, to all persons other than owners or tenants. Another measure made necessary by the bad spring fires was the postponing of the opening of the trout season.

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More than 1,000,000 Maine Christmas trees were shipped over the Maine Central Railroad this season, according to George H. Eaton, freight traffic manager. These shipments represented the high record since 1920. Christmas greens from Maine went to points as far distant as Milwaukee, Wis., and Jacksonville, Fla.

Seventy-nine employees of lumber companies serving as fire wardens in Texas, under instruc from both their employers and the State forest ser

◆

Forest fires caused less destruction in Pennsylv in the fall of 1926 than in any other fall seasor which the State forestry organization has rec Only 118 fires were reported after June 1, and t burned an average of only 8.7 acres each. nearest approach to this record was made in 1 when 122 fires burned an average of 100 acres eac

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Less than 6 per cent of the forest land of Alab was burned over in 1926, the State commissior forestry says. Studies made by the commission i cate that before it began its forest protection wor 1924, about 36 per cent of the State's forest land burned over annually.

Education and Extension

A Year of Forestry Extension Work

Results of forestry extension work in 1926, the first full calendar year of this work under the provisions of the Clarke-McNary Act, have been summarized by the Extension Service, United States Department of Agriculture, from the reports of county agents. The reports show that improved forestry practices were adopted during the year on 10,074 farms. These improved practices included forest planting on idle lands, windbreak planting, thinning and improvement cutting in existing woods, measuring and marketing farm timber, protection of woodlands from fire, and the preservative treatment of farm timbers. Agents in more than 30 States reported the planting of forest trees on 23,422 acres of idle farm land by 3,872 owners. In addition, windbreaks were planted on 1,679 farms. The improvement of farm woods was reported for 3,412 farms and involved 111,668 acres.

Four-H Forestry

In the two years since forestry was introduced as a subject of instruction in the Four-H clubs, forestry work has been undertaken by the clubs in 19 States. The year 1925 saw the work begun by clubs in New Hampshire, Vermont, Massachusetts, New York, Pennsylvania, Maryland, Kansas, South Carolina, Alabama, Tennessee, Oklahoma, and Colorado. Clubs of Michigan, New Jersey, and Wisconsin began in 1926, and this year's beginners are in North Carolina, C necticut, Minnesota, and Louisiana. (Forestry w for boys similar to that of the Four-H clubs has b carried on in Louisiana since 1925 under the direc of the State forester.)

In New York State 95 boys last year comple forest planting projects assigned to them by a cultural extension agents, planting 92,000 trees. first-year project in the New York clubs consist planting 1,000 trees on land that is unsuited for a cultural crops and on which no forest growth is sta ing, protecting the plantation from damage by st keeping a complete record of the work, and mak a report on it. In the present season 495 boys girls in 15 counties of New York are undertaking plant their 1,000 trees apiece.

Members of the Four-H clubs of Wisconsin called "junior forest rangers." Four successive or are open to them—forest crafter, forest plan woodsman, and cruiser. Each junior forest ran undertaking a forestry project for the first time ceives a gift of 300 coniferous seedlings from the W consin Conservation Commission, and each one en ing upon a second-year project receives twice t number.

A four-year program worked out by Extens Forester D. B. Demeritt for the Four-H clubs Louisiana, which will be undertaken this year in or seven parishes, devotes one year each to (1) identification, and thinning for pulpwood and pos (2) seed collection and thinning; (3) planting; and imber estimating. In order to market the products f the thinnings, cooperation has already been arranged ith leading lumber companies of the State.

New Hampshire clubs, with a membership of 40, ıst year planted 58,400 seedlings and improved 81 cres of woodland. The club formed last year in Varren County, N. J., required of each applicant for ıembership that he obtain the loan of at least 1 acre f abandoned or low-production farm land. Each ıember planted his acre with pine and spruce, the ıtter to serve as fillers for a few years and then to be emoved for Christmas trees. In Tennessee the requirement for admission was to gather, dry, and store peck of black locust seeds in preparation for this pring's planting. In Orleans County, Vt., a club of 0 girls whom E. L. Ingalls, the State club leader, has een instructing in woodcraft, have procured a piece f land and begun to reforest it.

xtension Forestry in Pennsylvania in 1926

Extension Foresters C. R. Anderson and Frank Iurphey, of Pennsylvania, last year conducted 93 lanting demonstrations. These plantings are designated by large signs naming the species and giving ıe dates of planting. Added to those of the preceding wo years they make 240 "result demonstrations" of lanting established by the extension service in Pennsylvania. In addition, 26 meetings were held during ıe year for the discussion of forest planting, with an ttendance of 1,904.

Work with farm woods was conducted in 23 counties and established 50 permanent result demonstrations, which like the plantings are marked so that passers-by on the highway may understand what has been one. Some of the 72 farmers who were given assistance with their woodland improvement problems reorted that as a result they were able to increase their eturns $20 to $25 an acre or more.

Marketing and estimating were demonstrated 14 mes. The cruising stick distributed by the Federal and Bank of Springfield, Mass., was shown to the 47 farmers attending, and sold to 40.

Iarvard Saves a Block of Old White Pines

Twenty acres of old-growth white pine and hemlock n Mount Pisgah, in the town of Richmond, N. H., as been purchased by subscription for Harvard University and will be kept in its natural state. The bit primeval forest of which this tract is a part is almost ıe last remaining in New England. Dr. John C. hillips, of Boston, took the initiative in collecting ıe money necessary for the purchase, about $1,000 acre, and was assisted by Prof. Richard Fisher, of arvard. The tract will be used for research by udents not only from the Harvard Forest at Petersham, Mass., but also from the Yale Demonstration and Research Forest at Keene, N. H. It will continue to be accessible by trail only.

A Forestry Missionary to Summer Camps

William Harlow, of the faculty of the New York State College of Forestry, will spend the summer visiting children's camps as a representative of the Society for the Protection of New Hampshire Forests. Mr. Harlow will go to both private and public camps. In each camp where room is found on the schedule for forestry work he will spend two or three days, presenting a plan of forestry teaching adapted to children of various ages and showing how it may be adjusted to the conditions of the individual camp. He will make use of colored lantern slides and photographs and will distribute printed matter.

Four-H Forestry Camp in California

A State camp for boys and girls of the Four-H clubs of California is being planned by club leaders with the help of Extension Forester Woodbridge Metcalf. The site is Whitaker's Forest, in Tulare County, between Grant Park and the Sequoia National Park. This forest includes in its 320 acres more than 200 large *Sequoia Washingtoniana* trees standing among young stands of yellow and sugar pine, sequoia, white fir, and incense cedar which have come in since logging. The camp buildings will be located in an old sawmill clearing of about 3 acres. As planned the camp will accommodate from 75 to 125 boys and girls at a time. Children will be sent to the camp as a reward for exceptional work in any branch of Four-H club activities, but only those who have satisfactorily completed forestry projects will be eligible to attend.

Farm Boys Demonstrate Forestry to Thousands

Two 15-year-old farm boys of Fremont County, Colo., Bill Howard and Bill Dunlap, last fall gave forestry demonstrations before audiences totaling thousands. After winning a forestry demonstration contest with other teams of Four-H club boys of their county, they were sent by the county to the State Fair at Pueblo and there in competition with two other county teams won the State championship. During the National Western Stock Show the boys were taken to Denver, through the cooperation of the Rocky Mountain Lumber Dealers' Association, the McPhee and McGinnity Lumber Co., the forestry committee of the Denver Chamber of Commerce, and the Denver & Rio Grande Western Railroad. While in Denver they appeared before the interstate meeting of the

Rocky Mountain Lumber Dealers' Association, the district office of the United States Forest Service, the Exchange Club, the Denver Chamber of Commerce (in open meetings), and the Baker and Byers Junior High Schools. The boys' performance was a coniferous tree-planting demonstration, from the collection of cones through seed extraction to field planting.

Mississippi School to Have Demonstration Forest

The Dixie Consolidated School, on the Dixie Highway, in Forrest County, Miss., owns a tract of 40 acres of culled longleaf pine timberland. Heretofore the timber has not been protected from fire or razorback hogs and mature trees have been cut for fuel for the school. Early in April Extension Forester H. C. Mitchell, of Mississippi, County Agent W. M. Sellers, and W. R. Mattoon, of the United States Forest Service, held an evening meeting at the school, with forestry talks and films. As a result of the meeting the board of trustees have decided to protect the school lands from fire, to use dead and down trees and stumps for firewood instead of cutting valuable trees for that purpose, to fence about 15 acres as a demonstration in protection against fire and hogs, and to plant slash pine on some flat land. The character of the land and timber, the prominence of the school in the county, and the location of the tract on the Dixie Highway promise to make this one of the most interesting and valuable demonstration forests in the State.

Cornell Exhibits an Ideal Farm Woodland

A section of an ideal farm woodland was exhibited in Fernow Hall, Cornell University, during the annual farmers' week in February of this year, which had an attendance of 5,179. Typical crop species for the average central New York farm were used—hard maple, white ash, basswood, hickory, red oak, and black cherry. Trees from 3 to 16 inches in diameter were shown, as well as saplings and 2 to 3 year old seedlings. An old rail fence fronted the exhibit, calling attention to the necessity of fencing woodlands from stock. The trees were marked with numbers, and a guessing contest was arranged so that visitors might test their knowledge of local species.

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A short course in the use of the portable sawmill was held at the Wisconsin College of Agriculture, Madison, Wis., during Farmers' Week, February 1–5. Mill, saws, belts, gas engine, and a sawyer were furnished by the Enterprise Co., Columbiana, Ohio. Saw manufacturing firms sent saw filers, and the Forest Products Laboratory gave advice. Announcements were made in the press that logs would be sav for farmers who would haul them to the college. T demonstration was attended by hundreds of farme and attracted so much interest that it was repea during the annual convention of the Wiscon Brotherhood of Threshermen, held February 16– with an attendance of 200.

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The eighth annual short course of the New Y State College of Forestry in dry kiln practice w held at Syracuse March 7–17, and was attended men from five different States. In the ten 8-h days of the course instruction was given in metho of piling lumber to prevent warping and twisti and in handling problems of case hardening a testing. Studies of dry kiln operation and of k layouts included observation of commercial kilns Syracuse.

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The Florida Federation of Women's Clubs working vigorously to arouse local interest in propos State forestry legislation. During the months February and March the federation carried out series of 61 meetings before women's clubs, Rota and Kiwanis clubs, schools, and colleges, at whi forestry talks accompanied by films were given Mrs. Lilian T. Conway of the United States For Service.

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Women's clubs of Ohio are competing this spri for prizes of $25, $15, and $10 offered to the thr clubs that plant the largest number of trees. T donor of the prizes is Mrs. George McDonald, Cincinnati, forestry chairman of the Ohio Federati of Women's Clubs. To stimulate interest in planti in April Mrs. McDonald arranged a series of fores meetings of clubs in Cincinnati and nearby towns which Mrs. Lilian T. Conway, of the United Sta Forest Service, gave talks illustrated with lant slides.

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A large increase in the number of students tak forestry courses is reported by the University of C fornia. About 300 students of the different colle are enrolled in forestry courses in the spring te Students majoring in forestry number 65, including graduate students.

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Planting demonstrations conducted by Extens Forester F. W. Dean, of Ohio, in 1926 required 353,7 trees and were attended by 533 people. Three me ings for the discussion of forest planting were atten by 130 people.

The summer camp of the Yale Forest School is to be ansferred this year to the Yale engineering camp at ast Lyme, Conn. There the university owns an cellent forest tract of 2,000 acres and fully equipped mp buildings. The former location of the school's mmer camp, on the property of the Pinchot family Milford, Pa., has become unsuitable because of the tting off of woodlands near Milford which were rmerly used in the work of forest mensuration.

* * *

Every student of the New York State College of orestry, Syracuse University, has agreed to contribute 1 a year to a fund from which loans may be made to udents in straitened circumstances to enable them complete their course. The fund will be controlled y Dean Franklin Moon.

* * *

Boys of the Sturgis Junior High School of San Berrdino, Calif., have organized a forestry club, under e leadership of County Forester Tuttle and Assistant arm Advisor Campbell. The boys hold monthly eetings for discussion of forestry topics, make eld trips with Mr. Tuttle, and raise and plant trees.

An engineers' loan fund has been created at the University of Washington. Loans are made without security to technology students, including forestry students, who have shown industry and application in their school work and who are in need of temporary financial help to complete the work of any quarter.

* * *

A research club in the plant sciences was organized last fall in Yale University under the leadership of Professor Toumey. The club is composed of faculty members and graduate students who have done or are doing investigative work and includes botanists, entomologists, foresters, chemists, geneticists, and biologists.

* * *

Correction: The 10 agricultural high schools in Mississippi mentioned in the March Forest Worker as having introduced forestry courses and acquired demonstration plots are not all located in Simpson County but are scattered through the State.

Forest Service Notes

Those Alaskan Sales

By E. E. Carter, U. S. Forest Service

Two sales of pulp wood on the Tongass Forest, laska, each for 835,000,000 cubic feet, have been vertised, bid for, and finally awarded to thoroughly sponsible bidders. Each award is accompanied by a commendation to the Federal Power Commission at a permit for the development of specific water owers be granted to the timber purchaser, in preferce to other applications. The sale in the south end the forest, commonly referred to as the Ketchikan it, was awarded to I. and J. D. Zellerbach, of San rancisco, officers of the paper manufacturing and holesaling corporation which bears the family name. hey produce newsprint at Port Angeles, Wash., om the same species of trees that grow in Alaska. fter careful study, they concluded that Alaska offers e best opportunities for an expansion of their newsrint production. The Juneau unit, in the north end the forest, was bid in by George T. Cameron, resident of the San Francisco Chronicle, who will have sociated with him Harry Chandler, owner of the os Angeles Times. These newspapers are using out 60,000 tons of paper annually, and the enterprise s an assured market for the greater part of the roduct of their mill.

Thus the vision of many men of the Forest Service ring the last quarter century approaches reality. Twenty-five years ago the "Alexander Archipelago Forest Reserve" was proclaimed and Supervisor Langille saw future pulp and paper mills. After the Forest Service and the enlarged Tongass Forest were organized, Supervisor Weigle had the vision more clearly. Then came Flory and Heintzleman, Gardner and Zeller, each with paper mills before their eyes. Wyckoff, Peterson, McKechine, and other rangers made long, hard boat and trail trips to wind up automatic stream gauges in the winter and thus add to the growing mass of definite data needed to make hardheaded engineers and capitalists also see the vision. Williams and his cruising crews bucked the wet brush in season and out to prove the (to them) obvious abundance of the timber supply. Dort brought his strength of leg and strength of mind and for two seasons, into the short days of November, ran his lines in the wet and cold, and reduced to definite engineering form the general knowledge of the Forest Service about the water powers of the region. Man after man stood the gaff of the hardest kind of work while wet, cold, mosquito-bitten, weary. Each saw ahead not personal riches, but a permanent paper industry, a more prosperous Alaska, and a growing rather than a storehouse forest.

Meanwhile there were discouragements. Alaska, to most people, meant bitter cold, tundra, ice, polar bears, gold rushes, Esquimaux, volcanoes, an island where seals bred, or a place from which canned salmon came

There was no timber in Alaska. There were trees, but they were short and scrubby, undesirable for pulpmaking so long as there were any trees anywhere else. Even some professional foresters viewed the prospect darkly, refusing to believe that good water powers were available, and failing to grasp the idea of cheap water transportation to the markets of the world. Paper production elsewhere would supply the world demand, and it would be a half century or more before economic conditions would justify mills in Alaska. The Forest Service men were ignorant enthusiasts, and their vision an impracticable dream.

Promoters came and saw an opportunity to use "official statements" to their own advantage whether paper production resulted or not. They demanded impossible terms, and when Graves or Greeley held true to their trust, howled about the "locked-up resources" of Alaska, and the howl was echoed from Alaskans who wanted to make a stake quickly—and leave. Their clamor was quieted by the last public speech of President Harding, after he had gone to the Territory.

Gradually the work on the ground gave definite data. Without question, the timber was there, and the cheap water power. Good engineers and timber cruisers, hired by paper manufacturers and others with capital seeking investment, checked Dort's reconnaissance of the water powers, Williams' cruises, and Heintzleman's statements, and reported them sound. The Alaska opportunity began to take higher rank in the order of assured future developments "when economic conditions permit." The half century shrank to a decade. Then Heintzleman took his data into the offices of men who could command the millions necessary before paper machines can turn in Alaska. He worked over the Forest Service contract. He sold the idea that the Alaska pulp chances were ripe, physically and economically.

And now the vision is taking on substance. It will take five years of time and many millions of dollars before either paper mill will be shipping newsprint to the presses, but the jam is broken. The bids show that, in the judgment of those best qualified to know—i. e., men already in the business on a large scale—the time has come to establish, on a permanent basis, the newsprint industry in this outlying Territory of the United States. Permanency for that industry underlies that decision. The development must not and will not be greater than can be supported by the growing power of the forest. Not timber mining, but timber growing is the foundation on which rests this expansion of the paper industry, of the prosperity of Alaska, and of the use of the present crop.

Superior National Forest Boundaries Enlarged

The way has been opened for a considerable enlargement of the Superior National Forest in Minnesota. By Presidential proclamation the boundaries have be enlarged to include 396,000 acres. Of the area with the enlarged boundaries 10,000 acres is already public ownership, and the National Forest Reservati Commission has authorized the purchase of such of t lands included in the new area as can be acquired at reasonable price. Much of the area is cut-over a burned-over land originally stocked with splend forests. It has been found unsuited to agricultur but if properly handled and in some places planted wit trees is believed capable of growing valuable ne forests.

Commission Authorizes Purchase of Land for National Forests

The purchase of lands to the value of $572,000 a additions to the eastern national forests was authorize by the National Forest Reservation Commission o March 7. These lands consist of 69 tracts, having total area of 96,038 acres, scattered from the Whit Mountains in New Hampshire to Minnesota and Arkansas. The prices approved by the commission averag $5.96 an acre.

The largest tract, one of 42,819 acres, is situate in White, Habersham, Lumpkin, Dawson, and Fanni Counties, Ga., on the eastern slope of the Blue Ridg Mountains. This in large measure rounds out th Georgia National Forest in this section and will b an important addition to lands protecting the headwaters of the Savannah and Chattahoochee Rivers A tract of 12,372 acres covered by the authorizatio lies in McKean, Warren, and Elk Counties, Pa., o the watershed of the Allegheny River. Another trib[illegible]tary of the Ohio River, the Monongahela, is to hav additional protection through the purchase of a trac of 10,336 acres in Hardy, Hampshire, and Pendleton Counties, W. Va. In Tennessee, 4,405 acres are to be acquired in Carter and Sullivan Counties, located on the headwaters of the tributaries of the Tennessee River and protecting the Muscle Shoals reservoir and dam. An area of 1,941 acres in Virginia lies chiefly on the watershed of the Potomac River. In New Hampshire it is proposed to purchase 9,541 acres as additions to the White Mountain National Forest, and in Arkansas 4,289 acres located largely on the watersheds of the White and Arkansas Rivers—affording additional protection to these highly erratic stream the waters of which have contributed much to the flood losses in that State. Smaller areas covered by the authorizations are in North and South Carolina and in Minnesota.

A New England delegation, headed by Allen Hollis, of New Hampshire, appeared before the National Fo[illegible]est Reservation Commission at its March meeting [illegible] urge Government purchase of 22,000 acres of land on the headwaters of the Merrimac River in the town of Waterville, N. H. This tract is suggested as an ad-tion to the White Mountain National Forest. The ommission authorized the Forest Service to make an amination of this land, which is now in progress.

At its first meeting of this year, held January 8, the ommission recommended that 430,457 acres of public nd be added to the national forests of the West; thorized the extension of the Monongahela National orest purchase unit, in West Virginia on the head-aters of the Potomac River, by about 80,000 acres; d authorized the purchase of lands totaling 35,334 res as additions to the eastern national forests. The rgest single purchase authorized at that time was ,131 acres in Pennsylvania on the watershed of the legheny River.

ourt Decision Opens Irrigation Lakes to Recreation

The decision of the United States Circuit Court of ppeals for the Eighth Circuit, on January 17, in the se of the United States *v.* The Big Horn Land & Cattle o. puts at rest the question whether irrigation grantees r natural lakes within the national forests may clude the public from recreational use of such lakes. r many years some uncertainty has existed as to st what rights were acquired by irrigation grantees der the act of March 3, 1891, which grants rights of ay over lands of the United States, including national rests, for reservoirs, canals, etc., to be used for the ain purpose of irrigation. It has become a practice individuals and companies seeking the benefits of is act to file on small lakes, particularly within the tional forests, and obtain the right to build dams at e outlets of the lakes and thereby use these natural dies of water for storage reservoirs. In some stances the grantees have posted signs around the kes stating that the lakes were "private property" d warning the public to "keep off." Since a great mber of natural lakes within the national forests e used for irrigation and power purposes, the claim the grantees to exclusive use of these lakes, if sub- antiated, would deprive the public of valuable ghts in connection with fishing, boating, and other rms of recreation.

In the case mentioned it was unnecessary to decide hether the irrigation company, if it had had a right use the lake involved in the case for storage pur- oses, would have had the right to exclude the public om the lake. Nevertheless the court made the fol- wing statement: "However highly prized may be the scatorial privileges claimed by the defendant, we d nothing in the act of March 3, 1891, granting to e defendant a limited fee in the land surrounding the ke for such purposes." Thus it is understood that d it been necessary for the court to decide the ques- on it would have held that the grantee had no right the lake other than to store water for irrigation urposes—specifically, that it had no right to exclude the public from fishing in the lake when the fishing would not interfere with the irrigation use which the grantee was authorized to make.

New Process Produces Cheap Print Paper from Hardwoods

A new pulping process that produces a high yield of cheap print paper from hardwoods has been developed at the Forest Products Laboratory at Madison, Wis. Hardwood chips are subjected to only a mild chemical treatment and then reduced to fiber through the use of a rod mill, a hollow horizontal steel cylinder half filled with steel or bronze rods. The substitution of the rod mill processing for a certain amount of chemical treatment brings about a high yield.

Paper of the weight and thickness of newsprint made wholly from semichemical pulp of black, tupelo, or red gum, or aspen, birch, or maple, has been found to have greater strength than commercial newsprint of the type now common. Paper equaling or excelling standard newsprint in color can be made from gums, if black and red heartwood are excluded. Pulp made by the new process from aspen and birch could be substituted for more than 50 per cent of the standard newsprint mixture of ground wood and sulphite pulp without sacrifice of quality. In fact, ground wood pulp and the new semichemical pulp can be combined without sulphite pulp, although the sheet made without sulphite is rather weak when wet.

The introduction of semichemical pulp from aspen and birch and possibly maple should assist materially in perpetuating the newsprint supply in the northern and northeastern regions. The new process offers an excellent opportunity for the development of a print paper industry in the Southern States, where there is a large supply of gum.

Friends or Enemies?

By L. J. Pessin, U. S. Forest Service

While lifting pine seedlings recently in the nursery of the Southern Forest Experiment Station at Bogalusa, La., P. C. Wakeley and I noticed on the roots of the seedlings numerous structures which, when examined under the microscope, were found to be ectotrophic mycorrhizas. The roots were practically without root hairs. Mycorrhizas apparently occur on all four species of Southern pine.

In certain plants branches of roots may become covered with a mantle of a nongreen plant (fungus). When this happens the branches cease to grow in length and begin to swell. In the course of a few days they have become club-shaped or Y-shaped, and are what we call mycorrhizas. A mycorrhiza is a sort of union of fungus and root. Frequently the fungus mantle does not penetrate into the interior of the cells, in which case the mycorrhiza is described as ectotrophic. As a rule root hairs, the thin and delicate structures which are usually found protruding from the surface layer of cells of roots just back of the root tip and which are the plant's principal means of absorbing water and salts, are not borne by plants possessing mycorrhizas.

Mycorrhizas were first described by Frank in a paper which appeared in 1885, and since then some 60 or 70 papers have been published from which we learn that many forest trees possess them. What effect their presence has on the life of the plant is still a puzzle. Some investigators have proved to their own satisfaction that mycorrhizas are harmful to the trees; others maintain that they are highly advantageous. It has been found that orchid seedlings can not thrive without this peculiar association of fungus and root; and it has been argued that where mycorrhizas are present on the roots of trees the fungus branches (hyphae) act as substitutes for the missing root hairs by spreading in all directions and bringing water and salts to the roots, obtaining in return certain nutriments that are stored within the roots.

Papers recently published on mycorrhizas, especially those of the past two or three years, present very contradictory opinions. Melin, of Sweden, for instance, asserts that mycorrhizas are of great help to the forest trees on which they grow, while Koki Masui, of Japan, in a paper published last year, maintains that they harm the trees.

It seems inconceivable that young seedlings the roots of which are literally covered with mycorrhizas should be able to thrive so well as some I have seen, if those mycorrhizas are really harmful.

The question as to whether mycorrhizas are friends or enemies of the forest trees, and just what influence they have on the survival of seedlings on various sites, seems to merit attention from both foresters and botanists.

Disease-resistant Yellow Pines for Nebraska

Yellow pines apparently immune to Peridermium were found in northern Nebraska during the past year by C. G. Bates, of the Rocky Mountain Forest Experiment Station, and seed were collected from these t for planting this spring on the Nebraska Nati Forest. No evidence was found of resistance to moth except through vigor that enables the tree outgrow the injury. It is believed that this prob may be solved by the use of local seed thoroughly ac mated. For the purpose of a fuller study of heredit tendencies and the development of a stand for v select seed production, all experimental lots on Nebraska National Forest will hereafter be plantec a segregated area.

About 15 lots of Nebraska seed were made availa for sowing in the Halsey nursery in 1927, some of th representing trees of exceptionally fine quality.

A Tolerance Test of Western Species

The ability of seedlings of the "tolerant" tree spec of the West to function with light of 1 per cent of t intensity of sunlight, when all other conditions a favorable, was confirmed by the results of experime made in the past year by C. G. Bates of the Roc Mountain Forest Experiment Station. In these expe ments, made under artificial light, redwood was fou vastly more efficient in weak light than most of t species, but was followed at no great distance Engelmann spruce and Douglas fir. The place at t foot of the list was taken by pinon, which however able to persist in weak light because of the large sto of food which the seedling derives from the seed.

* * *

A tract of 4,000 acres in the Coronado Nation Forest has been designated with the approval of t Secretary of Agriculture as an area to be kept in natural condition. This area is situated near Tucso Ariz., and the National History Society of Tucson h taken a particular interest in having it retained in i natural state.

* * *

Sixty-seven men passed this year's civil servic examination for junior forester.

General Forest News

Flood-Control Plan Must Include Forestation

By E. A. Sherman, U. S. Forest Service

Reforestation and forest protection will unquestionably enter into any plan for the future control of the Mississippi. Claims that the present flood is due to forest destruction or claims that reforestation has no bearing upon flood prevention are both exaggerations Every acre of land in the immense catchment basi of the Mississippi system contributes, in one form o another, at one time or another, to the flood problem It is idle to say the scores of millions of acres of for land within this basin have no relation to the floo problem. The plans for preventing a recurrence of a flood of this magnitude must, as one of their essentia ctors, include the reforestation of the headwaters of e Mississippi and its tributaries.

Although excessive precipitation in the main basin the Mississippi is a major cause of the present flood, any of its tributaries have contributed their own ods. Extensive deforestation on the headwaters of numerable feeder streams is partly responsible for pid melting of snow and for the rapid run-off of ow water and rainfall. Deforestation, accompanied repeated fires, has likewise encouraged erosion of e soil. These effects are particularly pronounced in lly and mountainous country where cut-over land is t extensively reclaimed for agriculture, and where peated fires have progressively denuded the land.

In making comprehensive plans it will be necessary, my opinion, to consider forests as affecting run-off, ow melting, surface erosion, channel cutting, and ting. In the long run extensive reforestation, by tarding the run-off, will supplement the artificial gineering work. Every dollar expended in reforest-g denuded land will return with interest through the le of forest products and water power and the mulation of industry. Flood prevention will come a by-product without actual cost.

In at least one region the present flood has raised e question whether the reclamation of bottom lands s not gone too far. Efforts are now under way for bond issue to purchase bottom lands along the inois River, a tributary of the Mississippi, in order at the overflow lands may be restored to their iginal function. Conservation agencies point out at this land has a great additional value for timber owing and game breeding, which, with reduced od-control costs, would tend to offset the loss of ricultural value.

merican Farmers' Loss Through Erosion

Rushing rainwater sweeping over the fields of the nited States carries away 20 times as much plant-od material every year as is permanently removed crops, says H. H. Bennett, of the United States ureau of Soils. The results of Mr. Bennett's studies dicate that erosion takes $200,000,000 out of the ckets of American farmers every year. A single unty in the Piedmont region was found by actual rvey to contain 90,000 acres of formerly cultivated nd that has been permanently ruined by erosion. another county in the Atlantic coastal plain 60,000 res has been ruined. Much of this land, because of extreme susceptibility to erosion, should never have en plowed, but should have been maintained in timber in pasture. In addition, not less than 3,000,000 res of good stream-bottom lands have been practically ined for agriculture by deposition of inert sand and avel and by increased swampiness due to channels oked with eroded soil.

"In this new country of ours," says Mr. Bennett, ve already have some good-sized monuments in the shape of land devastation, but we are not profiting very much from such examples. Land wastage by erosion is proceeding as rapidly as it ever did, except in a few sections."

Floods Reduce Lumber Production

The Mississippi River flood, the greatest known since the development of the river, is taking its toll of the lumber industry. Many million acres of bottom-land forest have already been inundated. Of the 6,628,000,000 feet of hardwoods cut in the United States during 1925, nearly 40 per cent came from the Mississippi Valley region. Approximately half the cypress cut also came from this section. Preliminary indications are that the loss in production during the latter part of April amounted to some 6,000,000 feet daily, with prospects of this increasing as the flood moved into the lower part of the river. Lumber stocks at a number of mills have floated away and many mills will be out of commission for several months. Because the high water has in many places made the logging railroad service uncertain many of the southern pine mills are having difficulty in operating full time.

Brush and Dam for Flood Control

The flood-control dam erected by the Los Angeles County Flood Control Commission in San Dimas Canyon, Angeles National Forest, is the first of a series for the construction of which a $40,000,000 bond issue was authorized. In one 48-hour period in April, 1926, 11 inches of rain fell in the San Dimas Canyon and 1,100 acre-feet of water was measured into the reservoir. The area of the watershed is 15 square miles. Therefore, during the 48-hour period there fell upon this watershed 8,800 acre-feet of water, of which 1,100 feet was held back by the dam and 7,700 feet by the brush in the canyon. H. S. Gilman, in charge of the dam, raised the question: If it is worth $700,000 to have a dam that will hold back 1,100 acre-feet of flood water in a single storm, what is the value of the brush on this watershed which held back 7,700 acre-feet?

McSweeney Forest Research Bill Gets Indorsements

The McSweeney bill, which proposes to codify and round out Federal legislation on forest research and to lay down a 10-year program for development of work in this field by the Federal Government, has been indorsed in principle by Secretary Jardine, of the Department of Agriculture. The Southern Forestry Congress, at its annual meeting in March, passed a resolution indorsing the objects to be attained by the McSweeney bill for the recognition of forest research as an urgent national need. The natural resources production department of the United States Chamber of Commerce at the recent annual meeting of the chamber indorsed the bill in the following resolution:

> Whereas it is highly important that all true forest lands be made permanently productive; and
>
> Whereas the President of the United States and the Director of the Budget have taken a constructive interest in reforestation by efforts to strengthen the forest protective activities of the Federal Government and to promote cooperation with States and private agencies under the Clarke-McNary Act; and
>
> Whereas the Hon. John McSweeney introduced in the second session of the Sixty-ninth Congress a bill (H. R. 17406) which would provide definite, authorized appropriations to the Department of Agriculture for promoting the full use of forest land for timber growing and other purposes, and would authorize a national survey of forest resources and timber requirements, also continue and expand research in timber growing, wood utilization, and the elimination of waste; therefore be it
>
> *Resolved*, That we, the natural resources production department of the United States Chamber of Commerce, in annual convention assembled, do hereby indorse the principles laid down in the McSweeney bill: be it further
>
> *Resolved*, That the several States and the Federal Government be encouraged to continue the acquisition of lands for reforestation purposes.

Southern Forestry Congress Meeting

By Herbert A. Smith, U. S. Forest Service

The keynote of the Southern Forestry Congress at its ninth annual session, at Jacksonville, Fla., March 22 and 23, was the necessity for more public education in forestry matters—and first of all, on the harmfulness of forest fires.

The president of the congress, H. L. Kayton, of Savannah, struck the note in his opening address when he urged the need for teaching forestry in the schools from the elementary grades up. In one way or another most of the following speakers likewise brought out the need of a better public understanding of the purposes, methods, and value of forestry as a prerequisite to widespread practice of enlightened forest management in the South.

Col. W. B. Greeley, speaking on "The development of cooperative forestry and what it means to Florida," laid particular stress on the necessity for "the creation of a forest consciousness among all ranks of people, and especially those who deal with the soil." Don P. Johnston, a former Forest Service man who is now a Florida naval stores operator, told the congress that in his judgment forestry legislation hitherto proposed in his State had failed to pass because it was too much in advance of forestry sentiment, and observed that "without public sentiment back of it legislative forestry can no more be effective than legislated morals." The resolutions adopted by the congress at its close included hearty indorsement of the educational activities that
are being fostered by National and State for
organizations, and urged State boards of educatic
avail themselves of the material being put out by
organizations.

Naturally, Florida's needs came in for special at
tion. Colonel Greeley said: "We are here to-da
urge the remaining three of the Southern Sta
Florida, South Carolina, and Arkansas, to join
States which have taken this first step"—that of qu
fying for Federal cooperation in fire control—"tow
the protection and restoration of their forest resourc
"A forestry policy for Florida" was the subject
paper by B. F. Williamson, president of the Flo
Forestry Association, and was also largely the the
of an address by Senator Fletcher that was one of
high spots of the congress. Senator Fletcher advoca
educational activities to overcome indifference
"create an interest in this vital matter," tax
revision, laws to check promiscuous burning, and, m
important of all, a State board of forestry authori
to employ a State forester and inaugurate system
protection of forest lands. The congress went on rec
in its resolutions as believing the time opportune
Florida to take this action, and urged similar actio
South Carolina, where a bill to create a State fores
department was then pending before the house, hav
already been passed by the senate.

Other resolutions urged enlarged public forest own
ship, National, State, and municipal, with espec
reference to a need for State forests in the Sou
pointed out the vital importance of larger provisi
for research and indorsed the idea of a Federal orga
act for this purpose; advocated study by the States
taxation with a view to facilitating private timb
growing; and expressed approval and appreciation
the work of the Forest Service under Colonel Greel

Col. Joseph Hyde Pratt, of Chapel Hill, N. C.,
whom more than to any other one man the Southe
Forestry Congress owes its existence, gave a paper
"National, State, and town forests." He held th
public ownership in the East and South should
greatly increased; that ultimately public fores
should approach one-half the total forest area of t
country, a higher ratio of public to private ownersh
in the West balancing one of probably less than on
third in the eastern part of the country; and that Sta
forests in the East and South should at least equ
Federal.

"Railroads and forestry" was the subject of a pap
by Roland Turner, general agricultural agent of th
Southern Railway system, who made evident th
very deep practical interest of this railroad in reforest
tion as a supporter of traffic and prosperity and as
means of escape from the menance of idle lands. Th
Southern Railway, he said, is itself practicing forestr
on a considerable tract originally acquired as a sou
of wood fuel for locomotives.

Two papers were presented on "Forestry possibiliti
for the hardwoods." One, by E. H. Frothingham, o

the Appalachian Forest Experiment Station, dealt with the more technical aspects of hardwoods management; the other, by John R. Thistlethwaite, of Opelousas, La., gave an account of personal experiences and the practices developed by a company that has long sought timber conservation both in its cutting operations and in its utilization practices. "We are fully convinced," said Mr. Thistlethwaite, "of the possibilities of timber growing in our region and are spending our time, money, and effort in building up the timber supply that will take care of the future needs of our sawmill operation."

"Putting pine lumbering operations on a permanent basis" was discussed by Alabama's State forester, Col. Page S. Bunker, who is confident that private enterprise will eagerly adopt improved practices as these are demonstrated to be financially advantageous to the landowner, and who specified various measures worth the lumberman's careful consideration which if adopted would mean forestry. "Forestry progress in the southern States" was hopefully reviewed by the several State foresters present in a series of brief talks.

A discussion of naval stores matters featured the afternoon of the second day, and included an address by State Senator I. J. McCall, of Jasper, Fla., on "The naval stores industry and the Florida reforestation problem." Senator McCall, speaking from lifelong experience in the pine country and with conspicuous earnestness and sincerity, made clear his conviction that conservative practices will pay good returns if properly applied and gave an illuminating recital of his own observations and experiments as a pineland owner and naval stores operator. The importance of fire control he regarded as beyond question. "The relation of the naval stores factor to the operator and to reforestation" was discussed by H. W. Wilson, of Jacksonville, and the research activities of the Forest Service in the field of naval stores production were outlined by Lenthall Wyman, of the Southern Forest Experiment Station.

The evening of the first day was devoted to a banquet, presided over by B. F. Williamson. H. N. Wheeler, of the United States Forest Service, gave a rapid-fire illustrated address on the need for forest conservation. Roy L. Hogue, State forester of Mississippi, followed with entertaining personal reminiscences of a European forestry trip last summer. Assistant Forester Will C. Barnes, of the United States Forest Service, closed the program with a delightful talk on "The romance of the grass lands" from an old western stockman's standpoint. He also pointed out the 50 per cent decline in the cattle industry in Florida within recent years and urged the owners of forest lands to utilize cattle grazing for fire protection and to offset carrying charges while young timber is growing.

The indoor sessions of the congress were followed by a field day for those who could stay over to inspect the work in naval stores research that is being conducted at Starke, Fla., by the Southern Forest Experiment Station.

Louisville, Ky., was chosen as the place of meeting for the 1928 session. The election of officers for the coming year resulted as follows: President, Tom Wallace, Louisville, Ky.; vice president, Senator Duncan U. Fletcher of Florida; chairman of the executive committee, W. D. Taylor, Dante, Va. (reelected); secretary-treasurer, E. O. Siecke, State forester of Texas (reelected).

Fire Loss in the Southern States

Forest fires of the year 1925 burned over 22,000,000 acres of forest land in the nine southern States, according to estimates given to the Southern Forest Experiment Station by the State foresters of the South. This is more than four times as much forest land as is known to have been covered by fires of that year in all the other States of the Union combined. However, it represents a decrease of 35 per cent from the area burned over in the South in 1914. The decrease is attributable both to more favorable fire weather and to the development of fire protection work.

The Wood Industries of New England

By Warren D. Brush, U. S. Forest Service

Changing economic conditions in the United States are profoundly affecting wood utilization in New England.

Probably the most important factor is the development and expansion of the Pacific coast lumber industry. Western pine and Douglas fir, which are available in large clear sizes, are being delivered to New England via the Panama Canal in competition with home-grown timber. This has resulted in a large falling off in demand for native softwoods for building purposes. Another factor is the slump in the wooden-box industry. The rapid progress in the development of the fiber container, particularly in increasing its strength, is mainly responsible. The plywood box, made very largely of hardwood veneer, has also contributed to the decline of the pine box. Some large New England box factories formerly using softwoods have gone to considerable expense in buying equipment in order to change to the manufacture of plywood boxes.

The movement of the cotton-weaving industry to the South has had a marked effect on New England factories making bobbins of local birch, maple, and beech for cotton weaving, and a number of the large bobbin and shuttle plants are now idle. New England has always been the stronghold of the thread industry, which requires a very large quantity of "spool wood," largely paper birch. Although the thread manufactured in New England in 1923 was worth 54 times as much as that manufactured in the cotton-producing States, nevertheless from 1919 to 1923 the value of thread manufactured had decreased 5 per cent in New England and increased 100 per cent in the cotton States. For the entire United States the value was practically the same for 1923 as for 1919. Whether the spool industry will be taken from New England depends largely on whether suitable wood for this use can be obtained in the South.

In contrast with the large falling off in the demand for bobbins and shuttles, there is great promise for New England in the production of other turned articles from hardwoods. Many factories are shifting from spool manufacture to the production of turned novelties such as handles of various kinds and the myriad of turned wooden articles to be found in the 5-and-10-cent stores. Such articles are produced from squares cut to standard dimensions.

Furniture factories in New England, particularly chair factories, use large amounts of local hardwoods as round-edge lumber, edged lumber, and dimension squares. While the quantity of dimension stock used by such factories is small compared with the quantity of round-edge lumber they consume, it seems probable that it will increase considerably. Studies by the Forest Products Laboratory have shown that in the manufacture of furniture, at least in many cases, the use of dimension squares is more economical than the use of round-edge lumber.

A large increase in the use of the hardwoods of New England seems assured through the manufacture of dimension stock. The general adoption of dimension stock, standardized both as to sizes and as to grades, would greatly encourage its use and bring greater profit to the hardwood industry.

Federal Forest Protection Board Organized

The heads of the bureaus responsible for the administration of Federal forest lands have been organized into the Federal Forest Protection Board, by an order issued by the Chief Coordinator, under the Bureau of the Budget. The board is headed by W. B. Greeley, chief of the Forest Service, and includes the chief of the Weather Bureau, the director of the National Park Service, the Commissioner of Indian Affairs, and the Commissioner of the General Land Office. At a series of meetings held on and since January 26 the board has considered "general policies and plans for the protection of the forests of the country, especially in the prevention and suppression of forest fires, embracing measures for the cooperation of Federal, State, and private agencies."

Low Temperatures Kill Western Pine Beetle

The effect of low temperatures on the western pine beetle was tested this winter by the Bureau of Entomology at the laboratory at Leland Stanford University, California, with a specially constructed apparatus in which temperatures as low as 24 °F. below zero can be maintained. Results indicate that th western pine beetle can not at any stage survive a bark temperature of −15° F. Mortality sets in a between 0° and −10°, and a very high percentage o the brood is killed by a brief exposure at the latte point. Predators and secondary insects showed different degrees of resistance to the low temperatures, and parasites were not killed at all even at −24° F.

Field checks indicate that the bark of standing infested trees retains a certain amount of its heat when the air temperature falls, and that the air temperature must fall somewhat below the critical point before the insects are subjected to fatal temperatures.

Bark Beetles Destroy Timber Worth a Million

A loss of more than $1,000,000 resulted in 1925 from bark beetle depredations in yellow pine stands o southern Oregon and northern California in which a control project of the Bureau of Entomology has been in progress since 1921. On the 1,267,000-acre area the bureau estimates, the western pine beetle and associated insects killed during the year 274,000 yellow pines containing 252,880,000 board feet of timber. At a valuation of $4.60 per thousand board feet, this means a loss of $1,161,510. The 1925 loss as revealed by a survey in 1926 was greater than that estimated for any year of the period 1920–1924.

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Island property of about 5,000 acres in the Mississippi River makes up the city forest of Winona, Minn. John Latsch, of Winona, has given this land to th city, piece by piece, and also gives about $2,500 a year toward its administration. A board of five members has control of the property and V. A. Lynne i in charge as forester. Mr. Lynne operates a fores nursery, which he plans to enlarge so as to supply al the stock needed for planting the barren portions o the islands.

This city forest is included in the Upper Mississipp Wild Life Refuge.

* * *

Electric power plants fed with sawdust, shavings hogged waste, and bark at the three principal mills o the Dierks Lumber & Coal Co. supply power not only for the company's own operations but for outside distribution. The three plants, which are situated at Dierks, Ark., and at Broken Bow and Wright City, Okla., supply approximately 450,000 kilowatt-hours a month to neighboring towns. They serve nearly a score of communities, many of which before this service was developed in the last three years were without electricity. The three mill power houses are joined together by a 33,000-volt transmission line.

Foreign Notes

Canadian Fire Record for 1926

"In eastern Canada," says the Canadian Depart- ent of the Interior, "both the spring and fall of 1926 ere cool and rainy so that new low records for forest e losses were established. A midsummer period of e hazard occurred in the East generally but it passed thout any great damage being done. In western anada, 1926 closely followed the two previous years, th in the intensity of the hazard and in the fire sses. Danger conditions continued, generally, roughout the season and the scant precipitation forded little relief from early spring to late fall.

"According to figures prepared in the forest service the Department of the Interior, there were 5,529 rest fires in Canada last year which burned over a tal area of 1,824,015 acres. The total gross damage d loss is estimated at $7,468,343."

In Nova Scotia and New Brunswick the spring was et and late and the fire hazard was low until July. onditions were threatening until the latter part of ugust when heavy rains occurred. In Nova Scotia total of 177 fires was reported but these burned only 2 acres of merchantable timber, 249 acres of young owth, and 222 acres of slash. The total area burned er was 3,181 acres. In New Brunswick 65 fires rned over 12,347 acres of which 93 per cent carried erchantable timber.

Losses in Quebec and Ontario were the lowest er recorded there. In Ontario 1,110 forest fires vered an area of 88,374 acres, including 12,734 res of mature timber and 28,886 acres of young owth. Although 20,000,000 acres was added to the e district during the year owing to mining and pulp erations, the area burned over was less than half at of the year 1925. Moist weather combined with e strengthening of the forestry organization in eping down the fire score. New district head- arters were opened at Sioux Lookout, and some 50 w mechanical units and several motor trucks were t into use.

In some ways the Prairie Provinces experienced the orst season in recent years both in point of the tensity of the fire hazard and in the losses suffered. Manitoba 463 forest fires swept 55,000 acres, in- uding about 8,182 acres of merchantable timber and ,500 acres of young growth. In Saskatchewan the e season was the most destructive since 1919, and as exceptional in that fires continued at frequent tervals throughout the summer instead of being con- ntrated in the usually well-marked spring and fall asons. The numbers of lightning and incendiary es were large, but settlers' fires caused the greatest ss. Of the 221 fires reported 121 were in or bordering on forest reserves but only 2 per cent of the total damage occurred on the reserves. The aggregate area of all fires reached about 550,000 acres, of which three-fifths was occupied by merchantable timber and one-fifth by young growth. In Alberta a long fire season characterized by marked extremes resulted in 279 fires, of which 26 occurred on Dominion forest reserves. Of this total 116 were detected and extinguished in the incipient stage and 90 more were suppressed before covering 10 acres. The total area burned over was 207,000 acres, including 37,000 acres of merchantable timber and 100,000 acres of young growth.

In British Columbia the unusually light snowfall of the winter of 1925–26 left the timber areas dry in April, and very little rainfall occurred during the succeeding six months. On the Dominion lands in the Railway Belt the season was the most disastrous yet experienced, 469 fires occurring. Only 35 per cent of these covered areas of 10 acres or more, and the total area fireswept was 198,995 acres. The main losses were in the difficult southern interior region. Lightning caused 25 per cent of the fires. Five hundred million board feet of merchantable timber was damaged or destroyed, and an area of 200,000 acres of young growth was fireswept.

A Commercial Planting in New Zealand

The New Zealand Perpetual Forests Co. in the past two years has planted Monterey pine on 54,655 acres of the North Island. Prof. Hugh Corbin, reporting in the Empire Forestry Journal on an inspection made in August, 1926, says "Since October, 1925, the company has raised 26,000,000 seedlings of *Pinus insignis* (*radiata*) for planting on its areas. In addition to these about 2,000,000 seedlings have been raised for the purpose of lining out so that 2-year-old plants may be obtainable for certain localities and places in which stronger trees are more suitable than seedlings. Further, some 2,000,000 seedlings were obtained from Rotorua. The bulk of this gigantic task has fallen on the shoulders of Basil Goudie, M. Sc., who has been in charge of the tree-raising section for several years. It is quite clear that the responsibility of raising successfully so large a number of trees is a very great one because any failure, either on account of bad seed or anything else, would mean that the program of planting in a given season would be an impossibility. * * * The seeds are obtained from trees which have been examined and passed as good parent trees. The cones are bagged up and brought to the forest nursery at Putaruru, they are then kiln dried and the seeds extracted and cleaned. That there is no dearth of seeds in New Zealand at the present time is indicated by an offer recently received for the supply of as much as 6 tons of *Pinus radiata* seed."

Next season a number of other conifers are to be raised in the nurseries in order that plantations may be made of them later on. Seeds of the following species are being sown: *P. ponderosa*, *Pseudotsuga taxifolia*, *P strobus*, and *P. pinaster*.

The New Zealand Perpetual Forests Co.'s project is being financed largely through the sale of debenture bonds. A consular report states that by September, 1926, the subscriptions for bonds amounted to nearly two million pounds sterling. One-third of the proceeds from bond sales is put into trustee reserve funds invested chiefly in Government securities and first mortgages. The company covenants to plant in the year subsequent to purchase of bonds an acreage at least equivalent to the number of bonds sold up to November 1. The bonds are each for 25 pounds sterling. To November, 1924, 6,432 bonds were sold and in 1925, 9,733 acres were planted. In the 12 months ended November 1, 1925, a further 35,763 bonds were sold and 44,922 acres were planted in 1926.

Oak Forests Dusted with Arsenic by Airplane

Some 3,500 acres of oak forest in the Oberforsteri Haste, near Minden, Germany, in the spring of 1926 were dusted with calcium arsenate by the use of an airplane, in an effort to combat the "eichenwickler." As a result the woods were almost cleared of the insects in a comparatively short time. However, severe losses resulted among game animals, despite the fact that the dusting was followed by a spell of rainy weather. Deer, rabbits, and birds fell victims to the poison. Great numbers of bees, also, were killed, and a number of domestic animals were affected. It is felt by members of the staff of the Chemische Institut der Tierarztlichen Hochschule at Hannover that the losses to wild life, the possible loss of domestic stock, and the threat to man who might eat mushrooms and berries gathered in the forest, is sufficient justification for discontinuing the practice, although in other locations similar losses were not noted after dusting with arsenic from an airplane.

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An organization styled "The Society of Foresters of Great Britain" has been formed "to advance in Great Britain a knowledge of technical forestry in all its aspects." Professional membership is confined to residents of Great Britain who are devoting full time to forestry or some branch of natural science connected with forestry. Officers of the society are: R. L. Robinson, president; Prof. R. S. Troup, vice president; Dr. H. M. Steven, editor; and R. Angus Galloway, 8 Rutland Square, Edinburgh, secretary.

Frank J. D. Barnjum, of Nova Scotia, is repea in 1927 his last year's offer of cash prizes to c forest rangers of the Province for fire-prevention w The three rangers making the best showing will rec awards totaling $1,000.

* * *

The Forest Association of Sweden, the Skogss skapet, has received from Mr. Edwin Ohlsson, one its founders, a gift of forests and sawmills valued about $500,000.

* * *

The airplanes of the Royal Canadian Air For which during the forest-fire season patrol practica the whole of Manitoba's accessible forested area, fitted with radio equipment. Messages giving s and location of fires, the position of the craft, and t condition of the engine are transmitted both by vo and by the Morse code. Voice messages have a ran of from 5 to 90 miles, and those sent by the Mo code are picked up at distances of from 150 to 1 miles. As yet no arrangements have been made f communications by radio from the ground to t planes.

* * *

German payments to France under the Daw plan in 1926 included timber valued at 18,000,00 gold marks. This was the first year in which Fran had cared to receive payment in commodities oth than coal, coke, and chemical products. In the fir two months of the 1927 year (beginning September 1926) payments in timber were valued at 4,500,00 marks.

* * *

Only 90 acres of woodland were burned over durin the 1926 fire season on the 16,000 square miles of terr tory covered by the operations of the St. Mauric Forest Protective Association, Quebec. Not a singl fire was started by a colonist. The association own 80 observation towers and has put up 1,600 miles o telephone wires.

* * *

The forestry department of the University of Toront has 51 students registered this year, including 9 fro countries other than Canada. Of these, 3 are fro England, 2 from the United States, and 1 each fro Finland, Holland, Norway, and Trinidad.

* * *

Revenues from State forestry operations of Finland last year amounted to 252,278,669 marks, according to preliminary calculations of the Finnish Forest Board, making the net profit from these operatio 136,442,769 marks.

Personals

Charles Sprague Sargent

Charles Sprague Sargent, director of the Arnold rboretum and Arnold professor of arboriculture at arvard University, died at Brookline, Mass., March , 1927.

Professor Sargent was for many years the foremost boriculturist in America and was the author of many orks on trees, among which the most important are lva of North America, a Manual of the Trees of orth America, a Catalogue of the Forest Trees of orth America, The Woods of the United States, and ne Forest Flora of Japan. He planned the Jessup llection of North American woods for the Museum Natural History at New York and was for 10 years itor of Garden and Forest. He also took a prominent rt in the development of public forestry in this untry, acting as chairman of the Commission for the eservation of the Adirondack Forests in 1885 and of e commission appointed by the National Academy Sciences in 1896–97 to formulate a forest policy for e United States. He leaves two enduring monuents, both of the kind most ardently desired by the blest minds—the great works on North American lva in constant use by foresters and tree lovers all er the world and that glorious and useful living monuent the Arnold Arboretum.

George Bishop Sudworth

George Bishop Sudworth, chief dendrologist of the nited States Forest Service, died at his home in nevy Chase, D. C., on May 10 after a very brief ness.

Mr. Sudworth was the dean of American foresters, connection with the forestry work of the Federal overnment dating from 1886. His preparation cluded a long period of university work in scientific udies ranging from dendrology and ornithology to edicine. In nearly 50 years of exploration and udy, to which he brought remarkable powers of servation and memory, he built up a vast store of ecise knowledge of the forest species and forest nditions of the United States. His many works on stematic dendrology include Forest Trees of the cific Slope, Cypress and Juniper Trees of the Rocky ountain Region, Pine Trees of the Rocky Mountain egion, and the widely known Check List of the Forest ees of the United States, their Names and Ranges, st now issued in revised form. With these may be entioned his preparation of an extensive series of nge maps of individual forest trees. Mr. Sudworth scovered and named a number of new species and rieties of American trees, and collected a very extensive herbarium. In 1900 he took a leading part in founding the Society of American Foresters. He contributed in an important way to the improvement of nursery practice, wood identification, basket-willow culture, and the introduction of exotics. He was keenly interested in arboreta, and directed the development of the Letchworth Park Forest and Arboretum, in Wyoming County, N. Y. He was an advisor to the War Department in the use and care of trees, and was frequently consulted by city authorities as an expert in shade-tree work. He took great interest in the Boy Scout movement and contributed the section on tree identification to the Boy Scout Manual. For the last 15 years he served on the Federal Horticultural Board, participating in important decisions regulating the importation and interstate shipment of plants and bulbs for the purpose of checking the spread of insect pests and plant diseases.

The Conservation and Development Commission of Virginia, which recently replaced the State's geological commission, has the following membership: William E. Carson, Riverton, chairman; Coleman Wortham, Richmond; Junius P. Fishburn, Roanoke; E. Griffith Dodson, Norfolk; Rufus Roberts, Culpeper; Thomas L. Farrar, Charlottesville; and Lee Long, Dante.

The personnel of the newly created Board of Conservation and Development of North Carolina is as follows: E. S. Askew, Merry Hill; F. S. Worthy, Washington; R. Bruce Etheridge, Manteo; Santford Martin, Winston-Salem; J. S. Gilkey, Marion; George L. Hampton, Canton; Frank H. Stedman, Fayetteville; Jas. G. K. McClure, jr., Asheville; H. L. McClaren, Charlotte; S. Wade Marr, Raleigh; Fred I. Sutton, Kinston; and E. C. Cranford, Asheboro.

Joseph S. Illick has been appointed State forester of Pennsylvania and deputy secretary of the State department of forests and waters. Mr. Illick has served in the forestry department of Pennsylvania for nearly 20 years, from 1907 to 1919 as a member of the faculty of the State forest school at Mont Alto and since the latter date as chief of forest information and director of forest research.

Don Matthews, forester for the Tropical Plant Research Foundation, has gone to Cuba on a two-year leave of absence to take charge of a reforestation project of the United Fruit Co. In preparation for reforestation work on the company's upland holdings in eastern Cuba, he plans to establish a forest nursery at Banes for the propagation of fast-growing tree species.

Newly appointed members of the Appalachian Forest Research Council are Verne Rhoades, consulting forester, Asheville, N. C., and Paul R. Camp, president of the Camp Manufacturing Co., Franklin, Va. Members reappointed to the council are A. B. Brooks, chief game protector of West Virginia; Dr. William H. Hutchins, president of Berea College, Berea, Ky.; John Raine, president of the Meadow River Lumber Co., Rainelle, W. Va.; Chapin Jones, State forester of Virginia; S. F. Horn, editor of the Southern Lumberman, Nashville, Tenn.; and Thomas H. Clagett, chief engineer of the Pocahontas Coal & Coke Co., Bluefield, W. Va.

A. M. Koroleff has left the Portland district office of the United States Forest Service to become secretary of the woodlands section of the Canadian Pulp and Paper Association.

E. H. Thomson, president of the Federal Land Bank of Springfield, Mass., and B. S. Viles, of Augusta, Me., were recently appointed to the Northeastern Forest Research Council.

Earl W. Loveridge has joined the Washington staff of the United States Forest Service as forest inspector in the branch of operation, taking the place left vacant by the transfer of Joseph C. Kircher to the branch of forest management. Mr. Loveridge has been a member of the Forest Service since 1913, his latest post having been that of forest inspector in the southwestern district. His successor in that position is Stanley F. Wilson, formerly supervisor of the Carson National Forest. The new supervisor of the Carson Forest is C. R. Dwire, formerly assistant supervisor.

Dr. Heinrich Hesselman, director of the Swedish Forest Experiment Station at Stockholm, is to be a representative of the Swedish Government at the International Soil Congress to be held in Washington, D. C., in June. Doctor Hesselman is well known both in Europe and in America for his investigations on forest soils, particularly on the relation of the soil nitrates in the humus and forest litter to the establishment and early growth of spruce. A plan to have him stay in America until late fall in order that he might demonstrate fully those methods he has so successfully employed in the study of forest soils did not materialize, although a fellowship from the International Education Board had been obtained. After visiting Washington, Doctor Hesselman intends to make a trip to the Pacific coast. Following this he plans to visit representative forest regions and forest research institutions in various parts of the country, returning to Sweden in September.

H. Friedrich Fhr. von Maltzahn, a member of the State forest service of Mecklenburg, Germany, attached to the office of forest management at Schwerin, is to arrive in the United States in May for a visit of six months. After a short visit with his cousin, the German ambassador, Mr. Maltzahn plans to visi forest schools of Cornell, Yale, and Harvard, a work in their libraries. Later he intends to visi rious sections of the country to see the results o estry practice. Mr. Maltzahn is interested pa larly in American trees that are being planted in many, including the red oak, shagbark hickory, nadian poplar, Douglas fir, and Sitka spruce.

Kinne F. Williams, of the staff of the New Conservation Commission, who has had charge o Lowville nursery, was promoted in March to the tion of supervisor of forest fire control work.

James E. Davis has become county forester of C tauqua County, N. Y., being employed jointly b local firms and organizations in cooperation with State college of agriculture and the United States partment of Agriculture. Mr. Davis is a forestry g uate of Cornell University and was formerly assis extension forester in charge of boys' and girls' wor the county.

Jay Price has succeeded to E. I. Kotok's for position as fire chief of the California National Fo District.

Charles W. Boyce, of the United States Forest S ice, has been awarded a Sterling fellowship of $2, for work in the Yale Forest School during the sc year 1927–28. He will undertake studies in fo economics which will be credited toward the Ph. degree.

W. C. Lowdermilk, professor of forestry at the U versity of Nanking, China, has safely escaped fr Nanking and has arrived with his family in Califor

G. F. Rupp, who was graduated from the Y Forest School in 1926 and is now assistant professo forestry at the Pennsylvania State College, was cho to assist in conducting this spring's forestry camp the Yale Forest School and to have charge of the scho summer camp for juniors.

George S. Perry, of the State Forest School Pennsylvania, is to teach forestry at this year's su mer normal school for teachers at Hattiesburg, Mi The two sessions of the school will begin May 30 a July 11.

W. G. Wahlenburg, who as assistant silvicultur of the Northern Rocky Mountain Forest Experime Station has been in charge of planting research at t Savenac nursury, has gone to the Southern Fore Experiment Station to take the place left vacant b the resignation of E. W. Hadley.

H. A. Maturen, formerly assistant State forester Alabama in charge of fire protection in the souther part of the State, has become forester to the Goodm Lumber Co., of Wisconsin.

John Foley, forester for the Pennsylvania Railroa since 1912, has been promoted to assistant to the pu hasing agent, in which position he will have charge of he buying of forest products and their preservative reatment. His former position is being taken by F. R. Krell.

James L. Averell, a forestry graduate of the University of California, who has spent the past year tudying forestry in Sweden on a scholarship from the Scandinavian-American Foundation, soon after returning to the United States in May will join the staff of he Lake States Forest Experiment Station.

Prof. Samuel J. Record, of the Yale Forest School, his winter made a second visit to Central America. He brought back wood samples and botanical material of 150 trees with which he was not previously acquainted, many of them from country that had not before been visited by collectors.

Prof. Walter Tupper, of the botanical department of the University of Michigan, and Dr. R. Kanehira, director of the Government Research Institute of the Department of Forestry, Formosa, Japan, are each spending two months this spring in the Yale tropical laboratory.

Lawrence C. Merriam has been placed in charge of a branch office newly opened in San Francisco by Mason & Stevens, consulting forest engineers.

Bibliography

Revision of Sudworth's Check List

There are 862 species of forest trees in this country, ccording to the recently revised "Check List of the Forest Trees of the United States," by the late George B. Sudworth, dendrologist of the United States Forest ervice. If the different varieties and hybrids are dded, the total of the different forms of forest trees eaches 1,177. Of all the trees that make up our orests, 182 species are of special interest because of he commercially useful timber or other products hey supply.

The previous check list, compiled 28 years ago, listed ut 604 different forest tree species, varieties, and ybrids. The enormous increase in the number is due artly to the addition of newly discovered native and aturalized trees and partly to the separation of tree pecies that previously were not distinguished from ach other.

It has long been the endeavor of the Forest Service to tandardize the common names of trees and to have the tandard common name of each species applied unirmly to the living tree and the timber cut from it. uch standardization of common names is particularly mportant in trade relations. In the new edition of the heck list each of the different trees is designated by s proper technical name and by the common name dopted by the Forest Service. There is given also for ach tree a list of all common names known to be pplied to it in different parts of its range. A list of he common names used by the Forest Service in esignating the commercial woods of our markets and he trees from which they are cut is accompanied by he names applied to them by the trade.

Copies of this publication, Miscellaneous Circular 2 of the United States Department of Agriculture, ay be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., t 40 cents a copy.

Forest Fires in Idaho

The importance of forest fire protection to a State two-fifths of whose area is forested and whose forest industries are its most important manufacturing enterprise is the subject of "Forest Fires in Idaho," a bulletin published under the provisions of section 1 of the Clarke-McNary Act by the Idaho State Cooperative Board of Forestry in collaboration with the United States Forest Service.

Discussing the great inflammability of Idaho forests, and the electric storms, low humidity, long dry summer periods, and strong winds prevalent in the State, the bulletin says, "Both forest and weather conditions make fire protection a very difficult job in the Idaho woods, yet the factors which have had perhaps the greatest influence upon forest destruction, particularly on private lands, are within human control."

A splended foundation for an adequate fire-protection organization in the State is seen in the voluntary timber protective associations which have been operating for 20 years and which are left intact by the forestry law of 1925. These associations have not, however, succeeded in enlisting united support from forest land owners; in fact, a number of the associations have been patrolling practically half of the forest land within their territories free of charge. And here, it is pointed out, "the present status of the * * * situation * * * is not so disquieting as the trend. Timberland owners have been paying for forest protection even on cut-over lands and have been patrolling a great deal of the noncontributing land, principally in order to protect their standing timber and logging improvements. When any timber owner is completely cut out or any separate region completely logged off, this incentive is removed and there is much danger that immense areas of cut-over land will be abandoned." The State forestry law, which became operative in March, 1925, is cited as appearing to be an excellent start toward solving the State's forest fire problem. This law requires every owner of forest land to protect it from fire, through an agency if he lives more than a mile away from the land; directs that logging slash be piled and burned or handled in some other manner approved by the State forester; provides for regulation of brush burning through a system of permits; makes deliberate and malicious setting of fire a felony; and enjoins fire-prevention practices on operators of engines, railroads, campers, and smokers. The effective enforcement of this law demands the support of an understanding and cooperative public; if Idaho's forest land is to be kept productive, the bulletin says, it must be through a full realization on the part of the State's citizens of the need for keeping it so. And the belief is expressed that with reasonable help from the State and the Federal Government "the private owner will see possibilities of reward for growing timber and will do his share in taking proper care of the land."

The Chemistry of Wood

By Edgar F. White, U. S. Forest Service

The Chemistry of Wood, by L. F. Hawley and Louis E. Wise, attempts to review in a single volume the purely scientific aspects of the chemistry of wood. Its material is presented under the following headings: (1) Chemical components of wood; (2) proximate and summative analyses of wood; (3) decomposition of wood; and (4) wood as an industrial material.

Most industrial and research chemists have heretofore dealt with wood in its entirety; but in this book the authors have stressed the chemistry of the botanical elements of wood—the phase of the subject that is most interesting to the forester, the botanist, and the wood technologist.

Although the forester may find the reading somewhat difficult in places, he will not fail to grasp the possibilities of chemical research on wood as here presented. The book will help him to realize more clearly the aid that chemistry offers in arriving at an understanding of the life processes of trees, in devising new methods of protecting forests from fire, insects, and disease, and in modifying and extending the usefulness and value of lumber and other forest products.

The book is a publication of the Chemical Catalogue Co. (Inc.), New York.

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Cunningham, R. N., and others: Montana forest and timber handbook. 162 pp. illus., diagrs. (State University of Montana studies no. 1.) Missoula, Mont., 1926.

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Hoyle, R. J.: The manufacture and use of small di sion. 94 pp. illus. (New York State Colle Forestry Technical Publication no. 20.) Syra N. Y., 1927.

Ludwig, F. H.: The retail lumber dealer and ho functions. 22 pp. (Yale Forest School lumbe dustry series no. 7.) New Haven, Conn., 192

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Indian Forester, March, 1927.—A resume of fo products research in the British Empire during 19 1926, by R. S. Pearson, pp. 141–150.

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Miscellaneous Circular 79, Forest Fire Preventi Handbook for School Children of California.

Miscellaneous Circular 94, National Forests of Cal fornia.

Yearbook Separate 847, How the Public Forests a Handled (reprint).

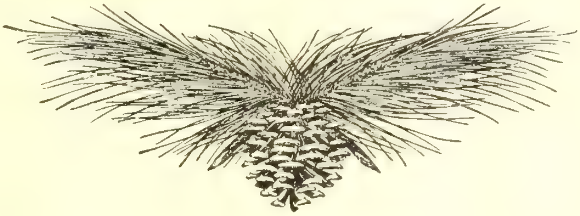
Map Folder, Umatilla National Forest (North Half).

National Forest Administrative Maps: ¼-inch, Challis Prescott, Santa Fe, and Shenandoah; ⅜-inch, Unaka ½ inch, Challis, Fremont, Montezuma, Moun Hood, and Shenandoah.

The annual programs of the Lake States, Appalachian, and Northeastern Forest Experiment Stations fo the year 1927 have been multigraphed and are availab for distribution. Requests should be addressed to the respective stations.

U. S. GOVERNMENT PRINTING OFFICE: 1927

FOREST WORKER



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UNITED STATES DEPARTMENT OF AGRICULTURE

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Announcements

Data Wanted on Forests and Floods

The Forest Service is undertaking a general study of forest conditions in the Mississippi River watershed as a basis for a comprehensive report that will probably be placed before Congress during its next session. The general plan is to bring together information as to the location and size of tracts on which protective forests are needed. For the purposes of this study "protective forest" is defined as a forest which, because of steepness of slope, erodible soil, or character of precipitation, or for some other reason, exerts a direct beneficial influence upon the behavior of streams. State forestry organizations, engineers, and other organizations and individuals have been asked to assist in this study by giving the Forest Service whatever data and information are available to them as to the protective influence of forests, flood history, and forestry measures needed to supplement engineering works. Anyone having data or information of possible value in this study is requested to communicate it to Associate Forester E. A. Sherman, United States Forest Service, Washington, D. C.

The study is to cover each of the six main tributary basins of the Mississippi watershed—the Ohio River, the upper Mississippi, the lower Mississippi, the Missouri, the Arkansas-White, and the Red River-Ouachita. Data are desired as to the location of areas which, because of climatic, soil, or other conditions, have a marked influence on streamflow or are especially subject to erosion; results of planting different kinds of forest trees on watersheds, as around reservoirs; measures needed to reclaim denuded lands that are rapidly eroding; dates, duration, and causes of floods and high water in the minor tributaries of the Mississippi; the presence of silt deposits or gravel banks in streams; damage to forest, range, or pasture lands resulting in erosion and rapid run-off, and measures necessary to put them in productive condition. C photographs showing the effect of improper land are especially desired, particularly pictures contras denuded lands with lands having similar physiogra features on which a protective cover has been m tained.

Hearing on Sulphate Wood Turpentine Standard

The Department of Agriculture has announced proposal to establish a United States standard "sulphate wood turpentine." A public hearing discuss the proposed standard will be held at the o of the Food, Drug, and Insecticide Administratio the Department of Agriculture, 216 Thirteenth St SW., Washington, D. C., on August 15, 1927, at 10 a.

Australian Solicits Correspondence with American Forester

H. Rooke-Jones, a dairy farmer of New South Wa has written that he would like to correspond with American forester who might be interested in go to New South Wales to organize a reforestation proj in the northeastern part of the State. His plan is consolidate the holdings of a number of landown and purchase other lands so as to make possible t sustained production of timber on a commercial sca He describes the available land as adapted for t growing of cypress and pine. Mr. Rooke-Jone address is "Mena," Yelgun post office, via Lismo New South Wales.

Correction

Through error the Forest Worker for May, 192 as printed bears the number volume 3, No. 4. I correct number is volume 3, No. 3.

Because the edition of this periodical is necessarily limited, its free distribution outside of the Government service is restricted to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

Material offered for publication in the Forest Worker should be addressed to the Editor, United States Forest Service, Washington, D. C.

FOREST WORKER

Vashington, D. C. JULY, 1927 Vol. 3, No. 4

State Forestry

Florida Provides for State Forestry Organization

A State forestry organization for Florida is provided r in a law approved in June. A State board of restry of five members is to be appointed by the vernor. The administration of the State's forestry tivities will be the duty of a State forester employed the board. Requirements for this position are chnical training in forestry and two years' experience practical and administrative forestry work. The tent and character of a candidate's experience must certified by the Secretary of the United States De- rtment of Agriculture or a State administrative officer ving personal knowledge in the case.

The maximum set for the State forester's salary is ,000 a year, and the whole amount appropriated for e use of the board of forestry during the next two ars is $25,000.

Under another new law of Florida anyone who sets e to or burns any wild forest lands or marshes that e not his own property is subject to a fine not ex- eding $1,000 or imprisonment in the county jail for t more than one year, or both fine and imprisonment. is also made liable for all damages, and the civil bility for damages obtains whether or not there is minal prosecution and conviction.

Clarke-McNary Allotments

In the fiscal year 1928 each State cooperating in est fire protection under the Clarke-McNary law ll receive from the Federal Government 8.5 per cent the estimated cost of adequate protection for its ate and private land. Last year's allotments were per cent of this cost. In addition to these "regular" otments the Federal Government will make extra otments according to the scheme which was origin- y contemplated under the Clarke-McNary law but ich heretofore could not be put into effect because ngress did not appropriate the necessary amounts. e extra allotments, totaling $110,000, will go to the States in which State and private budgets for fire prevention alone are greater than the regular Federal allotments.

It is expected that allotments of Clarke-McNary funds will be claimed this year by three new States which have just passed laws to create State forestry organizations—Delaware, South Carolina, and Florida.

State and private funds budgeted for forest protection during the year total less than $3,000,000. Combined with the Federal allotments, these amount to less than 40 per cent of the $10,200,000 which would provide the fire protection actually needed for the State and private forest lands in the United States.

The Federal allotments to the cooperating States are as follows:

State	Regular allotments, 8.5 per cent of cost of protection	Extra allotments	Total allotments
Maine	$38,250	$5,390	$43,640
New Hampshire	11,416	1,870	13,286
Vermont	6,698	330	7,028
Massachusetts	14,510	3,410	17,920
Rhode Island	1,224	110	1,334
Connecticut	5,100	1,430	6,530
New York	33,022	8,250	41,272
New Jersey	7,004	3,850	10,854
Pennsylvania	33,448	4,180	37,628
Maryland	5,610	880	6,490
Ohio	2,363	550	2,913
Virginia	30,991		30,991
West Virginia	16,362	1,870	18,232
North Carolina	41,438		41,438
Kentucky	14,404		14,404
Tennessee	21,250		21,250
Georgia	38,250	880	39,130
Alabama	38,250	110	38,360
Mississippi	32,555	1,100	33,655
Louisiana	29,087	3,520	32,607
Texas	30,532	330	30,862
Oklahoma	13,600	110	13,710
Missouri	11,000		11,000
Michigan	42,594	15,510	58,104
Wisconsin	27,276	4,620	31,896
Minnesota	55,743	8,690	64,433
South Dakota	128	247	375
Montana	16,618	2,090	18,708
Idaho (north)	25,500	6,600	32,100
Idaho (south)	2,958	550	3,508
Washington	36,125	11,330	47,455
Oregon	34,892	9,350	44,242
California	34,425	12,540	46,965
New Mexico	1,606	220	1,826

The amount tentatively reserved for allotment to the three new States is $12,765.

The total of allotments is $876,911. The cost of administration and inspection, including studies under section 1 of the law, is $73,089. These amounts, together with the $50,000 set aside by the Forest Service for studies of forest taxation, make up the full $1,000,000 appropriated by Congress for work under sections 1, 2, and 3 of the Clarke-McNary law during the fiscal year 1928.

Unexpended balances of allotments made in the fiscal year 1927 permit additional allotments to two groups of States: (1) Those that at the beginning of the year were not able to qualify for their full allotments but did qualify during the course of the year; and (2) those that had emergency fire conditions during the year. These States, and the additional allotments to them, are as follows:

GROUP I	
Georgia	$4, 920
Mississippi	2, 810
Oklahoma	1, 020
Total	8, 750

GROUP II	
Montana	$1, 000
Idaho	1, 500
Washington	4, 250
Oregon	1, 150
California	450
Massachusetts	100
Alabama	300
Total	8, 750

Wisconsin Constitutional Amendment

A joint resolution affecting forest taxation which had twice passed the Wisconsin Legislature was ratified by the people of the State in the election of April, 1927. It so amends the State constitution as to empower the legislature to classify forests and minerals for taxation purposes and have the forests and minerals assessed and taxed either separate from or together with the land.

Oregon Laws Aimed at Fire Control

Oregon legislation of 1927 authorizes a revolving fund of $25,000 to be used by the State forester in meeting emergency claims such as those for fighting fires in times and localities of unusual hazard. The governor is given authority to extend or shorten the burning season. The burning of slash is forbidden during the closed season except under permit. Locomotives burning other than oil fuel must be equipped with efficient screens to prevent the escape of fire from their ash pans when operating during the closed season on or within one-eighth mile of forest land, and any steam engine operating within or near inflammable forest débris must be equipped with a steam pump. It is provided that delinquent fire-patrol assessments shall bear the same rate of interest and the same costs penalty as the regular ad valorem taxes. And landowner or operator who is responsible for the ex ence or starting of a fire is made responsible also for suppression, regardless of whether the fire burns o on his land or spreads to other land.

Highway Patrolmen to Help in Fire Cont in North Carolina

Highway maintenance patrolmen of North Caroli will hereafter give assistance in preventing and su pressing forest fires, under an agreement of the Sta highway commission and the department of conserv tion. This brings an auxiliary force of approximate 1,000 men to the assistance of the forest warden for of nearly 3,000. All highway patrol forces will be fu nished maps showing the locations of forest warde who live on or near the highways, and instructions to how to reach wardens by telephone. Each patr man will be instructed by the highway commission report any fires he may discover to the nearest fore warden by telephone, by messenger, or in person, soon as possible, and to take the initiative in suppres ing any small fires that he may discover along h route. Highway patrolmen will also assist fore wardens in determining the causes of fires of which the have knowledge and in preparing cases against perso charged with starting fires. A number of highwa patrolmen will be given appointment as deputy fore wardens.

Increased Appropriations for Connecticut Forestry

[From summary by the Connecticut Forestry Association]

An appropriation of $70,000 has been made by th Connecticut Legislature for forest fire protection in th next two years. This is $40,000 more than th amount that was made available for this purpos during the last biennium. Authority has been give the State forester to organize special fire-fightin companies, and cities have been made responsible fo suppressing grass and brush fires within their boundaries. The governor has been authorized to close the fishing season in case of an unusually dry spring. The appropriation for the purchase of lands to be added to the State forests has been set at $100,000, with $25,000 for executive expenses in connection with purchase work. It is estimated that this will make possible the purchase of some 15,000 acres of land, which would bring the total of the State forests to about 50,000 acres. For the operation of the State forestry department during the two-year period $75,000 has been appropriated, and for the growing of planting stock for use on the State forests $5,000. The total appropriaons for forestry purposes for the biennium is $275,000, net increase of $47,500.

Laws enacted to improve the State's roadside tree tuation give the State park and forest commission pervision over the tree wardens, who have hitherto een responsible only to town officials; direct the com ission to make a scenic survey of the roads of the ate with a view of developing a parkway system; and ppropriate $25,000 for the planting and care of shade ees upon State highways.

Missouri Appropriates for Forestry

The Missouri Legislature has appropriated $20,000 r the support of the work of the State forestry depart ent during the next two years. This is the depart ent's first appropriation from State funds. Hereto re its activities have been financed by the Missouri orestry Association.

ew Auxiliary State Forest Law and Fire Law in Maryland

The Maryland Department of Forestry is authorized a recent act of the legislature to accept the use of ivately owned lands to be used as auxiliary State rest reserves. Such lands would be devoted to restry uses and would be subject to the laws, rules, d regulations governing State forest reserves. The ate offers no concessions in respect to taxation.

The maximum penalty for malicious or intentional tting of fires to woods, brush, grass, grain, or stubble Maryland has been raised to a fine of $2,000 or prisonment for five years, or both. The limits of e fine for setting fires through carelessness have en lowered to a minimum of $10 and a maximum of 00.

Pennsylvania Stops Free Planting Stock Distribution

Free distribution of forest planting stock by the nnsylvania Department of Forests and Waters is ought to an end by a recent act of the State legisla re. The department is authorized to offer trees for e at a price not exceeding the average cost of pro ction and shipping. The department will still re ire of those receiving trees the agreement that the ees shall be planted in Pennsylvania for watershed otection or for wood products and that they will not sold or removed until large enough for use as wood oducts. No trees will be sold by the department planting windbreaks or hedges or for use as shade ornamental trees, with the exception that trees may grown and sold to be planted for shade or ornamen purposes on State or Federal lands or public-school ounds or along State highways.

Ohio Law Authorizes Demonstration Forests

A new law of Ohio provides for the establishment of forests for the purpose of research and demonstration in practical forestry methods. The board of control of the Ohio Agricultural Experiment Station is authorized to purchase or acquire by gift farm woods or forest tracts representative of the various forest types of the State best suited for this purpose.

The Ohio forest tax law has been amended so as to clarify the assessment section. It now provides that land devoted exclusively to forestry or timber growing shall be taxed on the basis of its agricultural value, at 50 per cent of the local rate. Improvements and all values other than agricultural are to bear the full rate of local taxation; but the value of timber, mature or immature, will not be considered.

Town Forests in Maine

Cities and towns of Maine are privileged under a law of 1927 to acquire lands for municipal and town forests. A two-thirds vote of an annual town meeting or of a city government is sufficient to determine the purchase or acceptance of land for this purpose. The State forest commissioner is directed to furnish seedlings or transplants for planting such forests at cost and to be ready to offer the cities and towns his advice as to forest planting, management, and protection.

Another Big Planting Year in New York

The forest planters of New York State this spring set out five trees for every four they planted a year ago. This spring's total was 21,760,000. Plantings on State land called for 5,400,000.

In explaining the great enthusiasm for reforestation in the State, the New York Conservation Department cites the Fisher law of 1926, which provides that forest land planted since 1921 shall be assessed on the basis of the value of the land exclusive of the value of the trees, a tax of 6 per cent of the stumpage value being collected when the trees are cut. Another inducement is seen in the steady improvement of the State's forest fire protection system, through which the average annual forest fire loss in the fire towns for the past five years was held down to 0.14 of 1 per cent. Early plantings in the State, a good number of which are now 10 years old or older, are every year exerting greater influence as demonstrations of the profitableness of reforesting idle nonagricultural land. The value of protective forests on watersheds accounted this spring for orders for more than 1,000,000 trees.

Among large orders filled this spring was that of Otsego County, which has adopted a county forest planting plan that will cost $5,000 a year for 10 years.

The order of the board of supervisors together with those of municipalities and private planters of the county called for 1,000,000 trees. Essex County is likewise undertaking a 10-year forestry project on which it will spend $50,000, and St. Lawrence County this year began a county forest with 30,000 white pines furnished by the conservation department.

Pennsylvania Free Planting Stock Distribution

The record for free forest tree distribution in Pennsylvania was again broken this spring, when the State's nurseries gave up about 16,000,000 trees. Of this number more than three-fourths were shipped from the State forest nurseries at Clearfield, Mont Alto, and Greenwood. The largest output from any of the nurseries maintained at State institutions was the 1,588,350 trees distributed from the Rockview Nursery, Centre County, in which all the work of planting the seed and of caring for, lifting, packing, and shipping the seedlings is done by inmates of the Western Penitentiary. The Huntingdon Nursery, at the Pennsylvania Industrial Reformatory, shipped 1,152,550 trees. The Central Forest Tree Nursery established at Milton in 1925 sent out as its first crop 235,000 red oak and black walnut seedlings.

Mount Mitchell Lookout Tower Opened

A stone lookout tower on the summit of Mount Mitchell, N. C., was opened on June 17 and dedicated as a memorial to Dr. Elisha Mitchell. Doctor Mitchell was the first man to determine the peak's altitude. He lost his life, in 1857, in an attempt to descend it alone, and his grave is at the spot where the tower has been erected. The tower is a gift to the State from Col. Charles J. Harris, of Dillsboro, N. C.

Mount Mitchell, with its altitude of 6,711 feet, is the highest peak east of the Great Plains. Its summit is included in the Mount Mitchell State Park, consis ing of 1,224 acres, and is surrounded by lands of t Pisgah National Forest. The new tower, which about 35 feet high, will serve both as an observati point for tourists and as an outlook for the detecti and reporting of forest fires. It is being used by bo the United States Forest Service and the Nor Carolina Department of Conservation and Develo ment.

East Texas Business Men Indorse Forestr

The East Texas Chamber of Commerce at its fir annual meeting, held in Tyler April 21, adopted t following resolution:

Whereas adequate reforestation and the growing timber as a crop on the vast areas in the commerci timber belt of east Texas is of vital concern not on to the east Texas counties but to the State at large that a proper forestry program will make possible permanent forest industry, provide a huge pay roll a increased taxable assets: Therefore be it

Resolved, That the East Texas Chamber of Co merce urge the enactment of such fair and just legisl tion as may be necessary to bring about reforestati and proper forest management on lands best adapt for timber growing, and that this organization pledg itself to work with the Texas Forestry Associatio Texas Forest Service, and other groups in inaugurati and developing a constructive forestry program; a be it further

Resolved, That the East Texas Chamber of Co merce highly commends the efficient work now bei done by the Texas Forest Service and urges the leg lature to provide more adequate support for t activity to the end that the State may, to a great extent, meet its responsibilities and obligations alo all lines of forestry endeavor.

* * *

An appropriation of $15,000 a year for the next t years has been provided for the work of the Oklaho Forest Commission. The first appropriation w $5,000 a year.

Education and Extension

With or Without?

By W. R. Mattoon, United States Forest Service

Have we foresters been asleep on our job of "selling" the growing of timber as a profitable enterprise to the farmer or other owner who can cut his timber?

Take timber values, for example. When the farmer thinks of his field crops he sees his wheat threshed, sacked, and delivered at the railroad, his cotton crop picked and hauled to the gin, and his potatoes dug, cleaned, and delivered at the shipping point. His produce is sold together with his own labor and that of his team or gas engine. In the sa way many farmers think about their timber crops the form of products—pulpwood, firewood, crossti poles, and logs; but in spite of the fact that farm usually do or should do their own logging, forest usually talk to them about stumpage values. W not encourage the farmer to think more along the l of the market value of his forest products?

Granted that stumpage values are indispensable the forester and the statistician, do they give farmer an adequate conception of the returns of tim growing? During slack time in the winter season mer can very advantageously put his labor and at of his team into harvesting his timber, thereby aterially increasing his income. Furthermore, the mer is in a position—or with the aid of the State est workers and county agents can put himself in position—to do a much better silvicultural job of cutting or his logging than the average sawmill an or other buyer would do.

The following is offered as an estimate of the average urns to the farmer in growing southern pines and arketing them, with land rental and labor of man d team figured in as essential elements of value:

An acre of pine will grown an average of 500 board t of saw logs and one-half cord of wood yearly. is crop, cut and delivered at the mill or railroad, worth an average of $7.50. The items are:

0 board feet of lumber at $10 per 1,000 feet delivered at the mill or railroad	$5. 00
e-half cord of wood, at $5 per cord, delivered	2. 50
	7. 50

The farmer thus gets an average money return per e yearly of $7.50, itemized thus:

lue of timber grown (on stump)	$3. 00
e or rental of acre of land	. 60
bor of man and team in cutting the timber and hauling the product an average of 2 miles	3. 90
	7. 50

The farmer who figures on his returns for timber in s manner puts timber on a par with the other m crops; for such a calculation is applicable to all them. A large part of his profit from field crops nes from his labor. Why not get him to thinking the same terms about his timber crops?

New Policies, More Funds, and a New Dean at Michigan

Great expansion of the forestry work of the University of Michigan has been made possible by the action of the Michigan Legislature in appropriating additional funds for the university. The forestry department this fall will be superseded by a school of forestry and conservation. Two years of collegiate preparation in the basic subjects will be required for admission to the school, and its standard course will be one of three years' work leading to the degree of master of science in forestry. A two-year course will be offered leading to a bachelor's degree. Provision will be made for graduate work for which the degree of doctor of science may be conferred.

The man chosen to head the new school is Samuel T. Dana, director of the Northeastern Forest Experiment Station of the United States Forest Service, at Amherst, Mass. Mr. Dana is a forester of wide experience in research and administrative work. Since graduation from the Yale Forest School in 1907 he has been connected almost continuously with the United States Forest Service, leaving it only for one year's military service and for a two-year term as forest commissioner of Maine. He has for many years been a prominent member of the Society of American Foresters, serving terms as president, treasurer, and member of executive council. He is the author of numerous publications on forestry subjects, and was for some time a member of the editorial board of the American Forestry Association. Last year he represented the Forest Service at the World's Forestry Congress at Rome.

Gift to Cornell of Land for University Forest

A gift of 1,750 acres of forest land has been received by Cornell University from the heirs of the late Mathias H. Arnot, of Elmira, N. Y. The property, which has been known locally as the Rodbourn tract, lies near the village of Swartwood, mainly in Schuyler County but with its northern end in Tompkins County. It is easily reached from Ithaca. The tract was culled for white pine many years ago, and the merchantable hemlock and hardwoods were removed in a 14-year lumbering operation begun in 1873. A few years later fuel wood was cut, and in the following decade a novelty mill was operated for a short time. For nearly 30 years the tract has remained untouched.

Members of the Cornell faculty say that the land is typical of a large area of hill country in central and southern New York in which many farms have been abandoned. Its development as a university forest is to begin at once. The research to be conducted on it will include much of the work contemplated under the research professorship in forest soils recently endowed by Charles Lathrop Pack.

A Township Forest Fire Poster Contest in Pennsylvania

By H. A. Smith, District Forester, Weiser District, Pa.

Mount Carmel Township, Northumberland County, Pa., from the standpoint of number of fires, is one of the worst forest fire sections in one of the worst forest fire districts in the State. The township includes approximately 16,000 acres, of which probably more than 85 per cent is forested. This comparatively small area contains four distinct mountain ridges, as we know mountains in Pennsylvania, running through it from east to west. Between these ridges in the towns and the little villages commonly known throughout the anthracite field as "patches" lives a population of more than 30,000. The population is largely foreign, with Lithuanian and Polish predominating and with a large sprinkling of Italian, and the future of every individual is tied up directly or indirectly with the mining of anthracite. Outside of the towns and villages probably more than 95 per cent of the forest area belongs to three large coal companies and one large water company. Within this township, only about 5 miles square, with its dense population largely of foreign birth and with its concentrated ownership of property, there occurred in the 1926 spring fire season 75 forest fires burning over a total acreage of approximately 2,500 acres. Of these fires, as reported in the spring of 1926, 29 were caused by railroads, 10 were caused by "lokies" and steam shovels and other industrial equipment, and 36 were caused by individuals, including transients, brush burners, and smokers, or were of unknown origin.

Faced with this combination of conditions, Inspector Phillips, of the Pennsylvania Department of Forests and Waters, started out to bring to every man, woman, and child within Mount Carmel Township a better knowledge of forest conditions and an increased interest in the prevention and extinction of forest fires. Personal contact through such a large population was impracticable. The foreign population, whom we hoped to reach particularly, are not given to reading boiler plate on forestry subjects in the newspapers, and the schools seemed to be the only means whereby the general public could be reached. A poster contest was therefore devised, including each of the 12 grade and high schools, public and parochial, in the township.

The competition was for the production of the best posters tending to put the subject of forest conservation before the people, increase their regard for the forests about them regardless of ownership, and increase their interest in the prevention and extinction of forest fires. The Roaring Creek Water Co. and the Colonial Collieries Co. each contributed $25 to the prize fund, and Mr. Randal, superintendent for the Susquehanna Collieries Co., personally gave $10.

Prizes were offered to the children presenting the 10 best posters, $10 as first prize, $5 as second prize, $3 as third prize, and seven $1 prizes. Mr. Phillips visited each and every school and explained the proposition to the children, asking for care with fire in the woods at all times and assistance in the extinction of fires that do start, and for cooperation in this particular campaign. Samples of our own posters already in use were placed in each school, and considerable newspaper publicity was used.

The contest was quite a success. From the 12 schools, representing approximately 2,500 students, were submitted 808 posters, drawings, paintings, poems, phrases, slogans, and ideas. These had been selected by the teachers from a much larger number submitted to them. The entries included neat new slogans, such as "Park Your Sparks Carefully." Coupled with these were effective sketches, photographs, prints, and oil paintings. A. C. Silvius, forester for the Philadelphia & Reading Coal & Iron Co., and I served as judges.

The first prize went to Robert Hechler, a fifth-gra boy of Mount Carmel, for a poster in which the slog "Prevent forest fires," stands out in bold letteri over a simple drawing representing on the left han forest destroyed by fire and labeled "Burnt," and the right a living forest marked "Saved." The pri were given during American Forest Week, at a spec meeting in the Mount Carmel Township High Sch addressed by the superintendent of the Susquehan Collieries. Later in the week the winner, with father, was entertained by the Kiwanis Club, whi made up a small purse for him.

A plate was made of the winning poster at t expense of the Pennsylvania Department of Fores and Waters, and a local printing house printed 3,0 copies for $35. At least one copy was distributed each pupil of the schools in the township, and oth copies were distributed by the protection forces of t mining and water companies. The plate was print also in the Mount Carmel daily paper.

In the light of our experiences I have several sugge tions to make in regard to the conduct of such a contes

1. There should be separate contests, or at lea separate prizes, for grade and high-school pupils.

2. All entries should be of uniform size, entran being either provided with sheets of cardboard uniform dimensions or told where they can obtai them.

3. The use of more than one color should be pr hibited, owing to the cost of printing.

4. Judges should include two foresters or person interested in forest protection, and one advertising ma

First Year of Forest Extension in North Dakota

The year 1926 represents practically the first yea of extension forestry work in North Dakota, the wor having been first established July 1, 1925. During the year Extension Forester C. A. Gillett gave talks in 28 counties to more than 5,400 people. Farm women of the State showed a strong interest in the meetings, the average attendance being 93 men and 53 women. In the spring of 1927 public tree-planting demonstrations were given at 10 points in the State, and although held in crop planting time were attended by 216 farmers.

The interest shown by North Dakota farm people in tree planting is particularly striking in view of the difficulties connected with the growing of trees in the northern Great Plains. In order that as much as possible of the scanty rainfall and snow water may be conserved, the ground needs to be plowed and kept in mulch for an entire season before the planting is attempted. In addition the ground needs to be cultivated for from two to four years after the trees are tablished, in order both to conserve water supply d to prevent undue competition from grass and her vegetation. Thus the task of an extension rester in this region does not end with interesting ndowners in tree planting. He must give them fficient stimulus to make them willing to cultivate e land for the better part of a year before they can ow the first thrill of achievement that comes with anting the small trees, and after that to cultivate e trees as an eastern farmer cares for his orchard.

ll-Inclusive School Essay Contest Held in Humboldt County, Calif.

Every child in the schools of Humboldt County, alif., was given a chance to win a cash prize in the restry essay contest conducted there this spring nder the auspices of the Humboldt Redwood Re-restation Association. The contest plan outlined the Forest Worker of January, 1927, was used. ree sets of prizes were offered, the children being vided into groups as follows: (1) Grades below the xth, (2) the sixth and junior high school grades, and) the three upper high-school classes. Children in e primary grades were permitted to enter forestry ctures, cut-outs, or stories. From about 2,000 tries the teachers chose several hundred for submis-on to a committee of three judges including M. hester Merrill, supervisor of the reforestation asso-ation. Prize-winning essays were published in sev-al daily, weekly, and Sunday papers of the county ring American Forest Week.

ermont Association Holds Essay Contest for Eighth-Grade Children

Eight-grade children in all the 14 counties of Ver-ont took part in the forestry essay contest con-ucted this spring, for the second time, by the Ver-ont Forestry Association. "What Can Boys and irls Do to Help Forestry?" was the subject assigned. he rewards to the writer of the winning essay, arion Howe, of Brookline, were a prize of $25 onated by Mortimer R. Proctor and a trip to Rut-nd to read her essay before the annual meeting of e forestry association.

ree Planting at Ohio Extension Meetings

Extension Forester F. W. Dean of Ohio this spring onducted 33 planting demonstrations in 14 counties, nd gave 10 talks on forest planting before schools, rm bureaus, and granges. Demonstrations and lks combined reached 1,800 people. One of the emonstrations given during American Forest Week was in connection with the first planting on a small city forest being started by Bellville, Richland County. More than 250 townsfolk took part in planting 3,000 pines. At an all-day meeting in Medina County, 40 professional and business men planted 12,000 trees at Camp Crag, the summer camp of the Y. M. C. A. At Berea, Cuyahoga County, 600 school children planted Norway spruce for Christmas trees. At Minerva, Stark County, 20 boys of the vocational agricultural class of the high school under the direction of their instructor, O. E. Barker, took part in a demonstration that was witnessed by all the children of the school, two county agents, and the county superintendent of schools and his assistant. The boys planted 1,500 spruce trees on a hillside directly opposite the high school.

Plantings in Two New York Counties

A four-year educational campaign was begun last winter in Steuben and Schuyler Counties, N. Y., by Extension Forester J. A. Cope. The tentative goal was the planting of 100,000 trees in each county this spring. Mr. Cope reports that 98,000 trees were planted in Steuben County and 150,000 in Schuyler County, these plantings representing increases of 80 and 240 per cent, respectively, over those of the spring of 1926.

A window display panel furnished by the United States Forest Service was used in stores in six different small towns in the two counties, about one week in each place. Pine trees cut in the locality were used as a background, and in front of the panel was placed a bucket full of 2-year-old pine seedlings. Spectators were invited to register their guesses as to the number of trees in the pail. Each store owner offered a prize for the best guess, sometimes a planting tool and sometimes a $2.50 or $5 gold piece. The registration form called not only for the contestant's name and address but for the amount of idle land he owned, and by following up this information county agents were able to place some orders for trees.

Sawing, Scaling, and Grading Demonstration at Rochester, N. H.

An all-day demonstration of scaling, grading, and sawing lumber was given this spring at the plant of the Studley Box & Lumber Co., Rochester, N. H., through cooperation of the company with the Strafford County Farm Bureau. Nearly 100 State and county officials, lumbermen, and farmers of New Hampshire and western Maine attended. The party picked out a group of small, knotty, and crooked logs and another of large, smooth, straight logs fairly free from knots and watched the two groups go through the mill, keeping tab on the amount of lumber obtained. The small logs, which had been scaled by the New Hampshire rule and credited to the former owner at 200 board feet, produced 165 board feet of sawed lumber. The large, smooth logs, which had scaled 560 board feet in the log, came out at the other end of the mill as 626 board feet of lumber. The small logs were sawed at the rate of 2,100 board feet per hour, the large ones at 3,700 feet per hour.

At a sidetrack the visitors observed the work of an expert grader of lumber, who explained the basis on which he ordered the boards into this or that pile.

An afternoon meeting was addressed by Owen W. Johnson, of Manchester, president of the New Hampshire Lumbermen's Association, who emphasized the need of proper grading and the advisability of selling lumber before it is cut, so that the wanted sizes can be produced and a surplus of other sizes avoided.

South Carolina to Put Forestry in the Schools

The South Carolina Department of Education made a start during the past school term in introducing nature and conservation work into all the grammar and primary grades of the public schools. The plan adopted calls for the devotion of one period a week to the study of wild bird and animal life, game and fish, trees and forests, and wild flowers. The new work is to be outlined in the State teachers' manual distributed this fall. Herbert K. Job directs the work throughout the State, as State supervisor of nature and conservation studies.

* * *

The National Council of the Boy Scouts of America at its seventeenth annual meeting in New York City May 11 and 12 passed a resolution to take the necessary steps to cooperate actively with national, State, and local forestry officials in reforestation work. The council proposes that local scout organizations take part under State supervision in planting trees and shrubs of as many different kinds as possible in public parks, along roads and streets, in wooded lots, and on camp sites and idle land. This work is to be undertaken primarily as reforestation and secondarily for nature-study purposes.

* * *

Camp Fire Girls of Humboldt County, Calif., met February 12 on a cut-over area near the Carson Woods, back of Fortuna, to celebrate Lincoln's Day with songs and readings and with the planting of redwood seedlings. School busses and 20 private automobiles furnished through the cooperation of the Eureka Kiwanis Club carried the girls to the spot, and the Holmes-Eureka Lumber Co., owner of the land to be planted, furnished more than 1,000 seedlings from the Scotia Reforestation Nursery. M. Chester Merrill, supervisor of the Humboldt Reforestation Association, directed the planting, giving a preliminary demonst tion of planting methods. Close-up motion pictu were taken of the girls' planting work, to be used instructing other Camp Fire Girls.

* * *

The Nebraska Extension Service this spring tributed 180,000 forest tree seedlings to 1,161 farme Plantings were established in every county in State. The heaviest demands came from count where planting was done in 1926. For example, An lope County, with 6 plantings in 1926, this year ask for 41; Thayer County, with 6 plantings in 1926, ask for 43; and Holt County, with 7 plantings in 19 asked for 65.

Already 1,200 prospective planters have filed app cation with the Nebraska service for trees in 1928, a indications point to the planting next year of 700,0 seedlings and transplants.

* * *

The first Four-H forestry club of Ohio was organiz this spring in Harrison County under the direction County Agent Miller. As its first piece of work t club of 11 boys got 15,000 trees from the State fore nurseries and lined them out in nursery rows to awa planting next year. A mimeographed circular forest planting, illustrated with sketches, has bee prepared for the boys' use. Next fall each boy w start a small nursery with seeds of native forest tre collected by the club.

* * *

Rural children of Nebraska competed during Amer can Forest Week for prizes offered by the State depar ment of public instruction for the best 500-wo essays on forestry subjects. The awarding of priz amounting to $25 was made possible by the Izaa Walton League.

* * *

Business men of Friendship, Allegany County, N. Y have donated 65 acres of land to the village as a schoo forest. Dedication exercises were planned for May when Extension Forester J. A. Cope was to supervi the planting of 10,000 trees by the children of th school.

* * *

A new school for outdoor nature study is bein conducted this summer in the Allegany State Par about 75 miles south of Buffalo, N. Y., under the auspices of the Buffalo Society of Natural Sciences Dr. Robert E. Coker, professor of zoology in the University of North Carolina, heads a faculty of si members. The school aims to give practical field instruction adapted to the needs of public-school teachers and leaders of young peoples' organizations. It is known as the Allegany School of Natural History.

Forest Service Notes

preme Court Decision Clarifies Application of Fire Law

The Supreme Court has declared that to start a fire r timber or other inflammable material located on ional forest land and leave it unextinguished con- utes a violation of section 53 of the Criminal Code, n though the fire is started outside the forest boun- ies. This decision was rendered May 16, 1927, in case of D. J. Alford, of Crestview, Fla. Mr. ord was charged by a Federal grand jury with leav- unextinguished a fire he had built on land adjacent the Florida National Forest with the result that the spread to national forest lands where it burned ss and other material. The District Court for the thern District of Florida sustained a demurrer on ground that the statute under which the charge brought is not intended to cover the building and ving of fires elsewhere than on Government-owned d, and that if so intended it is unconstitutional.

Mr. Justice Holmes, in delivering the opinion of the preme Court, said:

"The purpose of the act is to prevent forest fires which have been one of the great economic misfortunes of the country. The danger depends upon the nearness of the fire not upon the ownership of the land where it is built * * *.

"The statute is constitutional. Congress may pro- it the doing of acts upon privately owned lands that peril the publicly owned forests * * *. Taken in connection with the danger to be prevented it [the statute] lays down a plain enough rule of conduct for anyone who seeks to obey the law."

Madison Laboratory Organizes Biological Section

A biological section has been organized in the Forest Products Laboratory to cover the activities of the laboratory that lie nearest to the work of the forest and range experiment stations. The new section will deal with research on such subjects as wood structure; the relation of wood structure and wood properties in general to tree physiology and growing conditions; forest tree morphology, physiology, and biochemistry; forest soils; the influence of light on forest growth; and on similar subjects in the realm of range investigations. Not all the problems relating to these subjects will be taken over by the biological section. Many can best be handled by the experiment stations, especially by those maintained in cooperation with universities. But within the field indicated there will undoubtedly arise some problems in connection with which preliminary work on technique and equipment can with distinct advantage be carried on at a central laboratory. Other problems although perhaps national in scope will be best attacked at a single location. It is expected that personnel and facilities will gradually be developed within the section to handle certain classes of routine tests on soils and instruments.

The new section is headed by Carlos G. Bates, who has for many years had charge of the Rocky Mountain Forest Experiment Station. An initial staff of seven persons has been assigned to it by transfer from the Forest Products Laboratory's sections of wood technology and timber mechanics.

Farm Implements as Trail Builders

By Richard E. McArdle, United States Forest Service

In a recent test of tools for building fire trails, foresters of the North Pacific National Forest District tried out 10 different kinds of plows and graders. The scene of the test was a typical yellow pine area on the Deschutes National Forest, Oreg. The tools tested included the rubottom plow, the Beatty plow, the Oliver reversible plow, an ordinary road drag, a modified drag called a ditcher, a road grader, a "pan-buster," single and double disk plows, a disk harrow, and a road "scarifier."

It was found that the share on ordinary plows invariably catches in roots and rocks and that this trouble is not entirely eliminated by using a rolling colter; that the frame of the disk plows is too near the ground, so that brush clogs up under it; that in all the drags, the Beatty plow, and the disk plows, the drawbar is so close to the ground that it catches brush and holds it in front of the tool; and that the small caterpillar tractor is much more flexible and efficient than a team of horses. The implements that did the best work were the disk plow and a home-made modification of the pan-buster.

From this test it seems that good results can be obtained with a single disk plow, 24-inch disk, mounted on a frame at least 2 feet above the ground in front and with the axles of the front wheels fastened rigidly. This rig makes a trail about 8 inches deep and 6 inches wide and throws the dirt, well broken, to one side for a distance of about 2 feet. Pulled by a 2-ton caterpillar, this plow made a good trail at the rate of 1 mile in 30 minutes and went up a 30 per cent grade with ease. The pan-buster, which in modified form gave better results than any of the other tools tested, is an implement designed for use on farms in breaking up hardpan. It consists in a rather heavy steel frame supported like a cart on two wide wheels 4 feet in diameter. A steel bar drops down from the rear and on the bottom of this bar is a long point projecting toward the front, as in a rubottom plow. The modification of this, which was made on the spot with the assistance of a local blacksmith, was to remove the long point and substitute a double moldboard, one board on each side of the bar. In completed form the implement resembled a shovel plow or middle breaker, except that the moldboards were much larger and longer and the point, or share, instead of curving down and outward was brought back and in like the prow of a ship. This implement scooped out a rounded trench about 8 inches deep and a foot wide and threw the dirt, well broken up, about a foot on each side, making a good trail about 3 feet in width. With a tractor it can build a mile of trail in 30 minutes, or on good ground 3 miles in an hour. The implement uproots brush 3 feet high and throws it to one side, and clogs very little. It is thought that by substituting a double disk plow for the moldboards even better results could be obtained.

Yellow Poplar Responds Vigorously to Liberation Cuttings

Yellow poplar seedlings on the Pisgah National Forest liberated through thinnings made by the Appalachian Forest Experiment Station in 1924 are showing a very satisfactory increase in height growth. The site is of high quality. When harvested in 1913 the stand yielded 40,000 board feet to the acre, one-half poplar. Two years later there were 5,000 yellow poplar seedlings to the acre together with sprouts and seedlings of other species; but a severe fire in May, 1916, killed or burned to the ground all the reproduction. A tally made in 1922 showed a preponderance of chestnut, silverbell, locust, and red maple sprouts, with much sumac, and a well-distributed reproduction of yellow poplar seedlings which were rapidly becoming suppressed by the sprout growth and sumac. Four half-acre sample plots, with interior reproduction plots, were established in the fall of 1923. In June, 1924, liberation cuttings for poplar were made on two plots. All the chestnut, silverbell, and dominant sumac were removed from one, and all the chestnut and silverbell from a second. The average numbers of trees per acre removed were, chestnut, 739; silverbell, 665; and sumac, 369. Two plots were reserved as controls.

In the control plots the average height of the poplar reproduction less than 1 inch in diameter at breast height is the same in 1927 as it was in 1924. This would seem to indicate that suppression and injury have just balanced new growth and reproduction. In the plots on which the poplar was liberated, on the other hand, the average height of the poplar reproduction shows an increase in the three-year period of 56 per cent.

Chemical Weeding of Longleaf Pine Seedbe

By Philip C. Wakeley, United States Forest Service

The zinc-sulphate method of weed control, develop at the Savenac nursery by W. G. Wahlenberg a applied on a commercial scale to western white a western yellow pine, has been tried on southern spec for two or three years by the Southern Forest Expe ment Station. Last year's test on longleaf was successful that the station persuaded the Gre Southern Lumber Co. to treat a 4 by 160 foot bed longleaf in their Bogalusa nursery.

The bed was treated February 17, 1927, with grams of commercial zinc sulphate per square fo The seed was sown February 25. On March counts were made on 20 square feet of the treat bed and 20 square feet of untreated beds. Germin tion was higher and mortality lower in the treat bed and weeds other than grass were almost entire lacking. Some Bermuda grass was coming in fro seed and from roots already in the ground, but amounted to only one-third of that in the untreat beds.

The same areas within the beds were examined April 1, when germination was practically complet The untreated checks showed 10 per cent few seedlings than the treated bed, three times as ma grasses, and sixty-two times as many weeds other th grass.

The cost of treating the 4 by 160 foot bed w about $1.80. A certain amount of hand weeding w be necessary because of the Bermuda grass, but it estimated that the total cost of this weeding and t zinc-sulphate treatment will be only from one-third one-fifth that of hand-weeding untreated beds of t same size.

* * *

Receipts from the operation of the national fores during the first three quarters of the fiscal year 192 showed a gain of more than $90,000 over those of th corresponding period of the preceding year. The Government's income from the use of the forests betwee July 1, 1926, and March 31, 1927, was $3,369,568.5 Timber sales brought in $2,303,324.93 during th nine-month period.

* * *

All camping parties entering the national forest of the California district since June 15 have bee required to carry at least one shovel and one ax fo each automobile or pack outfit. Smoking is bein prohibited on these forests except at improved camp and places of habitation. Both regulations were mad effective for an indefinite period.

* * *

The recent civil-service examination for the variou grades of silviculturist was entered by 36 men, o whom 29 passed.

General Forest News

International Soil Congress

From the forester's standpoint the most important ction of the International Soil Congress, held at Vashington, June 13–22, 1927, was the passing of a esolution recognizing the study of forest soils as a listinct branch of soil science and making provision or a forest soils section as a permanent part of the ongress, the next session of which is to be held in Russia in 1930.

At the meeting of the forest soils section held in Vashington, which was presided over by Dr. Fr. Veiss, of Denmark, about 60 delegates were in attendnce and 16 papers were presented. The majority of he papers dealing with definite results of soil investiation were presented by the delegates from foreign ountries. Dr. E. Melin, of Sweden, discussed the elationship between mycorrhiza fungi of trees and utrition. Experiments made by Doctor Melin showed hat the trees and the fungi in most cases live "in perfect symbiosis." The fungi are necessary for good levelopment of trees in soils having a high raw humus ontent. They are not always beneficial, however, nd sometimes injure weaker plants. Dr. S. A. Waksnan, of Germany, discussed the aerobic and anaerobic lecomposition of oak leaves: Dr. G. Kraus, of Gernany, the variations in the calcium content of the eaves of copper beech on various sites, the classificaion of soils, and the graphic representation of mechanial analyses; Dr. P. Albert, of Germany, the mechanical omposition of dune sand and its influence on the forestproducing capacity of the sand; Dr. H. Hesselman, of Sweden, the relation of forest and humus cover and the lose connection between nitrification and rapid deomposition of vegetable matter; Dr. Fr. Weiss, the listribution of colloids in Danish heath soils and the ffect of this distribution on the economic value of the oil. Among the Americans, F. J. Alway, of Minneota, discussed the effect of fire on the productivity of orest soil; R. E. Neidig and R. S. Snyder, of Minneota, the cause of low productivity of soils in recently leared coniferous timberlands; and F. B. Trenk, of he Maryland Forest Service, the occurrence of hicoria n Iowa in relation to soil type. Other papers by Ameriean delegates were of a general nature and in a number of instances consisted in an enumeration and explanaion of the problems that need to be attacked rather han in an exposition of results. It was evident from he sessions as a whole that in America the intensive study of forest soils is largely in the future.

* * *

The Southern Forest Experiment Station reports hat there is every indication of a good seed crop of ongleaf pine through Louisiana and Mississippi, and of slash pine in several portions of Louisiana.

New Figures on Forest Cover and Run-off

Fresh evidence as to the influence of forest cover on run-off has been brought forward by the Bureau of Public Roads, United States Department of Agriculture. In 1918 the bureau made a study of the rates of run-off from small agricultural areas. The site of the experiment was a hilly area of 112 acres on a farm near Jackson, Madison County, Tenn. Rainfall and run-off were measured with self-recording instruments on six watersheds, and for each watershed a tabulation was made of the rainfall and run-off in nine of the most intense rains of the year. The coefficient of run-off—the ratio of maximum rate of run-off to average rate of rainfall—was figured for each of these rains. The protective influence of timber came out in a comparison of the figures for two watersheds, numbered 1 and 4, of which 14 per cent and 38.9 per cent, respectively, were timbered. The run-off coefficients for the first-named watershed ranged from 0.33 to 0.49, those for the latter from 0.22 to 0.35. "These values," says C. E. Ramser, drainage engineer, in reporting on the experiment, "show quite conclusively that timber has a decided influence in reducing the rate of run-off from a watershed. However, the results obtained for the rain of July 18—for which run-off coefficients of 0.51 and 0.46 for watersheds Nos. 1 and 4, respectively, were obtained—tend to show that the effect of timber in reducing run-off is slight when the maximum rate of run-off occurs after considerable rain already has fallen. This is to be explained by the fact that interception and percolation on timbered areas are much greater at the beginning of a rain than later, so that an increasingly greater proportion of the rainfall runs off as the rain continues. The falling rain is intercepted by the trees, and the cover of leaves on the ground, until saturated, absorbs a large portion of the rainfall. On April 28 the average rates of rainfall were greater than on July 18, yet the * * * coefficients of run-off were smaller, being 0.41 and 0.25 as compared with 0.51 and 0.46 for the rains of April 28 and July 18, respectively. However, the rain that fell prior to the time of concentration (the time when all parts of the area are contributing to the flow) on April 28 was 0.09 inch for both watersheds, while on July 18 it was 0.76 inch for watershed No 1. and 0.71 inch for watershed No. 4."

The Turpentine Borer on the Florida National Forest

By F. C. Craighead, United States Bureau of Entomology

Some 20 years ago a plan of management was adopted for the Choctowhatchee division of the Florida National Forest that was designed to yield the greatest possible return of both gum and timber. The trees were to be worked for turpentine on a 12 to 15 year schedule, after which the timber was to be sold. This plan has been carried through, and during its progress improvements and modifications in turpentining practices have resulted in the development of what is known as the Forest Service or Government method of turpentining. In the last few years some of the first timber turpentined has been sold for lumber.

In the course of the cutting it became evident that a considerable percentage of the faces had been attacked by the turpentine borer. In a sale completed last year a 25 per cent deduction in the scale was necessary, chiefly because of defect in the butt logs resulting from the work of this borer. The number of windfalls due to the borer has also been high. Great damage was done last fall when the forest was skirted by the big hurricane.

It has long been recognized that this insect presents a serious problem in the turpentining regions, that it attacks dried-out faces and especially burned faces, and that the damage it does is usually associated with destructive turpentining methods and fires. A large percentage of the windfall in the southern pine region, particularly in the second-growth stands that have been so extensively operated in late years, is directly attributable to this beetle. The situation on the Florida National Forest presents a new angle of the problem. Here fire protection has prevented the burning of more than a few faces, and the infestation is associated with the exposure of faces for a long period of years. Thus it becomes necessary to devise means to operate on a long-time schedule without exposing wood in such a way that it will check so as to allow insertion of the borer eggs.

With J. A. Beal, who is in charge of the forest insect field station at Asheville, N. C., I recently made a preliminary examination of the borer infestation on a number of areas of this forest. Areas were so chosen as to permit comparison between different methods of operation and different periods of weathering of the faces.

The infestation can be briefly summarized as follows:

Type of turpentining	Date of first cupping	Number of years cupped	Percentage of faces attacked by borer
Experimental French method	1915	6	4
Experimental narrow-faced American method	1915	8	27
Forest Service method	1912	8	83
Boxing (on private land)			95

Infestation by the turpentine borer occurs only on wood that has been exposed in such a way that it checks and thus opens crevices in which the insect may insert its eggs. This checking may be the result of (1) fire burning off the protective coating of gum, (2) too deep scraping which removes all the gum and exposes the wood beneath, (3) drying out of the on the ridge between the two angles of the same (4) drying out of the wood as a result of dry fa or (5) drying out of the wood as a result of deep being made for the insertion of gutters.

The so-called Government or standard F Service method, particularly with the improvem adopted in the past two or three years, theoreti would prevent the greater part of the infestatio this borer. However, the scarcity of efficient labo makes it almost impossible to bring about perfect plication of the method. The French method practiced on the Florida National Forest on an perimental scale by I. F. Eldredge and E. R. Mc. stands out conspicuously as far superior to all Ameri methods in preventing borer infestation, chiefly cause this technique produces a narrow concave f as contrasted to the wider, two-angled face made w the American tools. There is a tendency to a cert amount of drying along the middle ridge of the f even when the Government method is used, wher with the French system the concave face preve checking and concentrates what resin flow there is the center of the face where the deepest exposure wood occurs. In my opinion some modification of t French system could be adopted that would preve practically all borer infestation and at the same ti meet the objections that are held against the syste

As is so often the case, prevention of injury by t insect coincides with good forestry practices—in t situation, fire protection and conservative turpentinin

No Fires—Fast Growing Pines

By W. R. MATTOON, United States Forest Service

The land holdings of the Timber Products C headed by Alex K. Sessoms, at Cogdell, near Wa cross, Ga., are coming to be a Mecca to those intereste in the growing of slash pine as a business enterpris Mr. Sessoms has had good success in keeping dow fires, and the cut-over lands are reforesting as if b magic. The saplings which once formed thicket have in a few years taken on new life and under con servative turpentining are now yielding a handsom profit.

Mr. Sessoms started about 10 years ago in the cattl business. First he found out that his cattle thrive far better on lands that were not burned. His fence excluded the scrub cattle in a measure and kept thei owners from setting fires on his fenced lands. Next he found that turpentining was more profitable than the cattle business, and he quickly saw the high potential value of the incoming young forest for turpentine and timber.

In March of this year I measured some slash pine on the lands of the Timber Products Co. Trees 6 years old were 10 to 15 feet high, 10-year-old trees 20 to 30 feet, and 22-year-old trees, which form exensive stands now being worked for turpentine, were rom 45 to 60 feet high and from 8 to 10 inches in iameter at breast height. One 22-year-old slash ine that had grown under full light measured 17 inches n breast height diameter and was about 60 feet high. Ir. Sessoms and his associates in the business feel hat they are just beginning the working of a big aying gold mine.

Turpentining operations are being carried on with xcellent supervision under lease to reliable operators.)nly one cup is allowed on a tree, irrespective of size. 'his promises from 20 to 30 years of "working" the rees. Under the system in use the face is chipped or five years, the tree is rested for two years, a new ace is then started, and so on until three or four aces have been worked. The tree is then ready to e cut for lumber.

The money returns from slash pine, here in the eart of its best growing region, mount up very ttractively at the present time. Mr. Sessoms estiiates that under the method just described (which night well be called the five-two-year system) 25 cres of slash pine, with good management, will perit of the working of a crop (10,000 cups). Under resent wild conditions on cut-over land that was ormerly burned over every year, from 500 to 700 cres are required for the working of a crop. The verage yearly gross returns for the gum in the tree, ccording to an estimate which Mr. Sessoms regards s very conservative, will be from $10 to $20 per acre. 'his means that the total returns for the gum in he tree (or leasing value) will be from $400 to $800. 'his estimate takes no account of the additional alue of the timber when the 40-year-old stand is cut or market. At the present time the value of the rees is thought of only in terms of their leasing value or crude gum.

Ribes Eradication Experiment

In efforts to control the white pine blister rust by reeing white pine areas of Ribes, it is necessary to go ver the ground repeatedly. Some plants are sure to scape detection on the first working, and even when he area has been thoroughly cleared of plants it must e expected that seedlings and sprouts will later make heir appearance. This is amply borne out by an 'absolute eradication" experiment conducted by the ffice of blister rust control, Bureau of Plant Industry, n cooperation with the New York Conservation Department.

The test was made on a 10-acre area in a tract of nixed white pine and hardwood at Deerhead, in the own of Lewis, Essex County, N. Y. Because the eaves of the Ribes play such an important part in preading the disease, a careful count was made not nly of the plants removed but of their leaves. In 919–20, 219 Ribes (principally gooseberry) plants to the acre were removed, with an average leaf production of 69 leaves per bush or 15,000 per acre. In 1924 the area was again carefully examined by members of the office of blister rust control and the Ribes were again completely eradicated. At this time there were found 53 seedling Ribes 1 year old or older per acre, or 24.3 per cent of the original stand. These new Ribes had an average of 12 leaves per bush or 625 per acre, only 4 per cent of the number originally found. In addition to the seedlings were found 1 Ribes that had previously been missed, 90 Ribes from sprouted rootstocks, and 172 seedlings recently germinated. These made up a total of 793 Ribes, with 1,172 leaves per acre.

In the 1919–20 operation, 87.7 per cent of the Ribes and 98.2 per cent of the total leafage found in six workings were removed the first time the area was gone over. On the sixth and last working no Ribes were found. In 1924, 60.6 per cent of the Ribes and 70.3 per cent of the leaves found in nine workings were removed the first time the area was gone over, and the first four workings removed 90.9 per cent of the Ribes and 91.7 per cent of the leaves.

Forest Pathologist Seeks Blight-Resistant Chestnuts in Japan

R. Kent Beattie, of the office of forest pathology, Bureau of Plant Industry, sails July 9 for Japan to enter upon a two-year search for blight-resistant chestnuts. A Japanese forester and other local assistants will be employed to help him in this work. He will search primarily for forest-tree chestnuts rather than for the nut-producing varieties, many of which are of poor form and development for lumber purposes. Most of the Asiatic chestnuts introduced into this country in the past have been of the orchard type. Mr. Beattie will visit Korea and Formosa and may visit China and the East Indies. Since the blight that has killed the native American chestnut is present in these countries, chestnut species surviving there are proved to be blight resistant and are desirable for introduction into the United States. Those growing in the Japanese Empire are especially desirable, because the climatic conditions of the parts of the United States in which the chestnut originally grew are more closely approximated there than in the more southerly countries of the Orient.

Considerable trouble is anticipated in getting viable chestnuts from the Orient into the United States because the nuts quickly spoil, especially those from the Tropics. Other possible difficulties in this work are suggested by the outcome of the first effort to introduce *Castanea henryi*. In the forests of China, where it is a large forest tree, this chestnut grows well in spite of the blight. Individuals introduced into this country, however, succumbed to the blight within a short time.

Mr. Beattie's work in the Orient will include an effort to straighten out taxonomically the oriental species in the genera Castanea and Castanopsis, which now are in a state of confusion. He will send back seed from selected forest trees of other kinds, but this phase of the work will be merely incidental to the effort to introduce blight-resistant chestnuts of forest form.

Breeding Poplars for Pulp

With the pulpwood supplies readily available to operating mills in the eastern States steadily dwindling, many operators are seeking to increase the productivity of their holdings through fire protection and selective logging. It has remained for the Oxford Paper Co. to attack this problem on a new line—through research looking to the production of a tree capable of attaining pulpwood size more rapidly than the native species.

Efforts to breed poplars of more vigorous growth were begun by the company three years ago, in cooperation with the New York Botanical Garden. Dr. A. B. Stout of the botanical garden and E. J. Schreiner of the paper company have as their associate in this work Dr. Ralph H. McKee of Columbia University. Besides the many kinds of poplars of blooming age growing at the New York Botanical Garden those at Highland Park, in Rochester, N. Y., have been made available for use in the breeding experiments, as have trees of the northern form of the necklace poplar (*Populus balsamifera virginiana*) on the grounds of the New York Agricultural Experiment Station at Geneva, N. Y.

Seedlings have been obtained from 96 different cross-combinations between species and varieties, and breeding within several species is well under way. More than 13,000 seedlings are now being grown. The number of seedlings reared from any one cross has usually been limited to 200, although in a few cases the number of sister hybrids being grown is about 500.

The northern strain of the necklace cottonwood, which grows rather widely in New York State, has been used freely, both as male and as female parents. Another species rather freely used is *Populus trichocarpa*, one of the largest of the broadleaved trees of North America, which grows wild from southern Alaska through western Washington, Oregon, and California to the San Bernardino Mountains. Various forms or varieties of the black poplar (*P. nigra*) of Europe have been used, as have the white poplars *alba, alba canescens, alba nivea,* and *adenopoda.* Some of the most promising of the hybrids have come from such crosses as (1) *P. balsamifera virginiana* X *P. trichocarpa*, (2) *P. angulata* X *P. trichocarpa*, (3) *P. angulata* X *P. balsamifera virginiana*, (4) *P. alba* X *P. tremula Davidiana*, and (5) *P. alba* X *P. adenopoda.*

In two years, of which one was spent in flats and one in a nursery, plants in a number of the groups of hybrids have reached heights of more than 6 feet, and one seedling has grown more than 7 feet. All seedlings obtained, whether from cross-pollinations from inbreeding, are being carefully studied. Sel tions have already been made of the most promis for rapid propagation as clonal varieties, for tests reforestation, and for studies of their pulp-maki value.

Virginia Mill Practices Selective Cutting

A strict policy of selective cutting has been put in effect by the Camp Manufacturing Co. on fee lan tributary to its mill at Franklin, Va. This mill pr duces something like 35,000,000 feet of lumber yearl and has available some 400,000,000 feet of merchan able pine and much young timber. From 20 to trees between 12 and 16 inches in diameter at brea height are being left on each acre of all except t overmature and badly damaged stands, and on the seed trees are being left. The Camp Manufacturi Co. is one of the oldest lumber companies of the Sout having been continuously in business in southeaste Virginia since soon after the Civil War. Its refores ation plans have been worked out with Hall, Kellog and Co., consulting foresters.

Prize-Winning Waste-Prevention Devices

The big prize of $1,000 in the national waste preve tion contest of this year was won by a multiple guic dimension mill designed by Wm. J. McHale, of th Menominee Bay Shore Lumber Co., Soperton, Wi In cutting slabs, wide edgings, and long trimmin produced in lumber manufacture into dimension stoc with this mill, preliminary sorting and changing set-ups are made unnecessary and the best yield fro each piece of stock is made possible. The mill ha four simultaneous set-ups. Three are stationary, eac with provision for as many as eight saws and for a close spacing of the saws as 1 inch. Slotted brass cove over the arbor guide the pieces and permit the cutting u of stock as short as 12 inches without choking the saw Thus these three set-ups can turn out pieces as smal as 1 by 1 inch by 12 inches. They will take in piece up to 12 inches wide. The fourth set-up accommodate stock up to 27 inches wide and is used for ripping stoc wider than 12 inches so that it can be fed into the othe three set-ups. This fourth set-up has a movable guid and only one saw. The machine thus provides fou different set-ups at the same time, handles stock as wide as 27 inches, and turns out pieces as small as 1 inch square and 12 inches long.

The second prize of $500 was for an edger scale and indicator designed by A. L. Thomas, of the A. C. Tuxbury Lumber Co., Charleston, S. C. Stationary and movable arms extending about 10 feet at right angles to the saw mandrel are fitted with pointers extending downward at the outer end and with indicators at the w end traveling along a graduated scale. The pointers e in line with the saws, so that the operator can sight e boards, keep down edging waste, and get the eatest possible yield of square-edged lumber from ch. The graduated scale and indicators enable him cut exact stock widths. The indicators are adjusted adjustment of the saws and thus add nothing to the st of operation.

Other prizes were awarded as follows:

Third group, $100 each: R. J. Moore, of Ernest olge (Inc.), Tacoma, Wash., method and necessary tachments for aligning band saws with carriage. ed Wiebner, of Kneeland-McLurg Lumber Co., illips, Wis., pressure roll device for horizontal resaw. E. Wyman, of Clark Nickerson Lumber Co., Everett, ash., lumber trimmer table board turning device.

Fourth group, $50 each: I. H. Ellington, of W. M. tter Lumber Co., Fremont, Va., sectional edger feed ll. A. T. Kjelland, of Weyerhaeuser Timber Co., erett, Wash., lumber edger line-up device. Edward cCluskey, of Cloquet Lumber Co., Cloquet, Minn., proved rearrangement of dogs for holding small gs on carriage. Bob Merry, of Clear Fir Lumber Co., coma, Wash., method for manufacturing perfect l round.

A Roadside Planting in North Carolina

The Chamber of Commerce and Agriculture of anklin, N. C., has assumed responsibility for the anting of white pines along 14 miles of highway 286, tween Franklin and the Georgia State line. About 0 trees were planted this spring during American rest Week. Placed at intervals usually of 50 feet, in o rows 27 feet from the center of the road, the trees line about 3½ miles of the highway. In planting the trees the chamber had the help of forest officers of the Nantahala National Forest, the North Carolina Highway Commission, and owners of property along the route.

* * *

Thirteen towns in Vermont and two in Connecticut were released from the gipsy moth and brown tail moth quarantine restrictions July 1, the Federal Horticultural Board of the Department of Agriculture has announced. The Vermont area covers 475 square miles, the Connecticut area 93 square miles.

* * *

Fourteen new plants for the preservative treatment of wood were constructed in this country in 1926. This brings the total number to 187, of which 180 were in active operation in 1926. The material treated during the year amounted to 289,322,079 cubic feet, an increase of more than 14,000,000 cubic feet over the quantity treated in the year 1925.

* * *

Redwood trees grown from seed planted 14 years ago by the Polson Logging Co. near Hoquiam, Wash., have attained a diameter of 18 inches at the butt. Experiments of the company indicate that redwood is one of the fastest growing trees in the district.

* * *

The Humboldt Redwood Reforestation Association, of Humboldt County, Calif., in its nursery at Scotia produced 2,236,000 redwood seedlings for field planting during the 1926–27 season—enough to reforest about 4,200 acres. Last fall the Pacific Lumber Co., a member of the association, shipped 920 pounds of redwood seed to New Zealand and the Union Lumber Co., another member, sent more than 1,000 pounds.

Foreign Notes

The Lesson from Savoy

By E. N. MUNNS, United States Forest Service

The Department of Savoy in southern France is bject, like all mountainous countries, to sudden floods its upper and lower valleys, and it is doubtful if there another locality in the world where these occur ore frequently. In the period from 1711 to 1920 no ss than 1,509 floods of importance were recorded, this spite the fact that many of the earlier records are complete. This list does not include general wide- read inundations of the lower country such as curred in 1733, 1772, 1859, and 1899. Neither does include those that devastated the entire bottom nds of certain of the major streams, each of which s in effect several minor floods combined in one.

The frequency of these disasters shows that they are due not to prolonged rainfall over a large area but to local accidents such as heavy summer thunderstorms or excessively rapid melting of snow as a result of warm rains. Very often these sudden outbursts turn mountain streams into rivers of mud and stones which upon reaching the valleys spread out and deposit their load of silt and débris upon the fields, roads, and villages, destroying valuable agricultural lands, interrupting transportation, and causing heavy property damage.

Similarly, Savoy is more subject to destructive landslides than any other part of France. Many of these landslides are caused by excessive rains or heavy snows on the steep slopes. They are particularly frequent and disastrous where the forests have been destroyed by overcutting and reproduction has been prevented by fire and overgrazing. At the present time about 5,600 acres of land is particularly subject to landslides which greatly increase the damage done when the rivers in the valleys overflow their banks.

The amount of money damage caused by floods in Savoy can scarcely be estimated. Its magnitude may, however, be gauged from the fact that 11 river floods which took place between 1921 and 1924 caused losses upward of 30,000,000 gold francs. During the first 10 years of the present century at least 100 floods occurred causing more or less destruction. The financial charges against real property along the Savoy as a result of floods is therefore exceedingly high.

Various attempts have been made by foresters and engineers to determine whether the floods are more numerous now than formerly. Such studies have been greatly handicapped by the insufficiency of data from earlier years and by the encroachments of dikes and levees upon the rivers in the last few generations. Thus, 60 floods are recorded in the sixteenth century, 53 in the seventeenth, 329 in the eighteenth, and 1,025 in the nineteenth. Matters appear to have grown considerably worse since the eighteenth century, and it appears probable that destructive floods are now more than four times as numerous as they were at that time.

In part this may be due to a change in climate, since investigations show that during the nineteenth century the mean annual temperature increased more than 2° F., while the average annual rainfall decreased. On the other hand, the number of serious thunderstorms has risen from 9.6 yearly during the period 1830–1839 to 19.6 yearly from 1880 to 1900. This change is in large part attributed to deforestation. In 1738 the forests of Savoy covered some 7,250,000 acres, but through overcutting, fire, and overgrazing there was a loss of some 850,000 acres of forest by 1824 and a further loss of over 350,000 acres by the end of 1910, or a total loss of about 17 per cent of the original forest area. On this destruction is placed the blame for a more rapid run-off of surface water and hence for increased floods.

In order to protect the valleys from inundation and from flood, huge sums have been spent on levees. Since the revolution more than 20,000,000 gold francs have been spent in building levees along four of the principal streams. The value of these works is questionable, as the deposition of débris has raised the beds of the streams and necessitated higher and bigger dikes. The latter have not always been particularly successful in preventing flood damage and do not take care of the landslips. Sometimes a landslip makes the levee system useless by damming up the stream, which later tears out the obstruction and causes heavy losses in the lowlands.

After long years of unsuccessful engineering effort, the French decided that systematic forestation is the only practicable flood-control measure of permanent value. A general scheme of forest planting has worked out for Savoy and reforestation is now undertaken on some 25,000 acres. The incre damage from floods in the Province has made l conditions so precarious and placed such heavy ch against property that radical measures will be n sary to prevent heavy emigration. Already the p lation has shown a decrease. Whereas the censu 1848 indicated more than 564,000 people in Savo 1921 the population had fallen to less than 461,00

Cooperative Forestry in Finland

By W. N. Sparhawk, United States Forest Service

Small timber owners are often handicapped by difficulty of selling small quantities advantageou The same difficulty often leads to wasteful utilizat Where only a few trees are available at a time g timber is frequently put to inferior uses, such as firewood, because of the impossibility of selling it higher uses and better prices.

In order to increase their incomes and encour systematic forestry on privately owned land, the F nish forest owners have turned to the cooperative s tem that has been so successful in the agriculture northern Europe. A Central Cooperative Society Forest Owners was organized in 1921 with a capital 10,000,000 marks. The common stock can be quired only by local "cooperatives" or associations forest owners following cooperative principles, by co munes, by parishes, or by the State. Preferred sha are sold also to individual or corporate forest owne In 1926 the shareholders included about 8,000 priva owners, 176 rural communities, 80 cooperative dairi and a large number of parishes, cooperative sawm companies, and other societies. The society is head by three directors, with an advisory council of nin Of the net profits 30 per cent is put in the reserve fu and 10 per cent is used to redeem preferred share Out of the balance interest up to 7 per cent is paid stockholders, with an additional 2 per cent on pr ferred stock if funds are available. Any further su plus is prorated among the associations that have don business through the society.

The society aims to encourage and guide privat owners in proper handling of their forests, to hel them get the maximum returns, to engage in the preparation and merchandising of forest products for export, and to direct the activities of local forest associations. It deals with local cooperative associations where such exist, rather than with individuals. It i acquiring and developing warehouses and loading facilities at important ports of export, and already owns four warehouses. In 1924 it handled an export business of a little over 38,000,000 marks.

Eight local cooperatives have been organized and more are contemplated. Any individual or corporate forest owner within the territory of a local society may ome a member by subscribing to its stock in an ount based upon his forest acreage. The local ieties handle sales of forest products within the ntry, turning all export business over to the central iety. They also furnish technical advice to forest ners. Several own sawmills and saw logs for their mbers. The local cooperatives put part of their fits into a reserve fund, pay shareholders up to 2 cent more than the prevailing commercial bank e of interest, and prorate the balance, if any, among owners for whom business has been transacted ing the year.

By pooling the small lots of timber cut by a large nber of owners, the associations are able to sort the s and to offer quantities large enough to attract vers. In consequence they can sell as advantausly as the big commercial companies and the indiual forest owner is assured of a market for his cut n if it consists of only a few trees. Since more than f of the forests of the country belong to private ividuals, mostly in comparatively small holdings, s believed that the success of the cooperative prom will be of the greatest significance for Finnish estry.

Spain Wakes Up

By W. N. SPARHAWK, United States Forest Service

Spain, which has suffered more from deforestation n any other country of Europe, has recently approated 100,000,000 pesetas, or $19,300,000, for reestation. This sum is to be spent before the end of 6, and in all probability will be followed by further ropriations.

Decrees signed by King Alfonso on July 26, 1926, and rch 24, 1927, provide for starting the work by ablishing nurseries covering at least 10 hectares .5 acres) in each Province. Six seed-extraction nts are to be established in addition to those already sting in six Provinces. The new plants will have a al capacity of 52,500 kilograms (115,700 pounds) of d, and will be used principally to extract seed of *us pinea* and maritime pine. Seed and plants are be furnished free to private individuals, corporans, and municipal and provincial authorities. Bees supplying planting stock, the Government will ance to private owners 25 per cent of the cost of nting idle land. Repayment of this cash advance is be begun when the plantations are old enough to ld returns and completed within a period of 25 years.

Where the owners are unwilling to undertake reestation, idle land may be taken over by the Government. Such as is suitable for colonization will be ned over to the colonization bureau and the reinder will be reforested by the State, either alone or cooperation with local governments (municipal or vincial). By contributing 50 per cent or more of the t aside from that of technical supervision and seed plants, which the State will furnish in any case, the al government can obtain title to the land.

Special attention is to be given to the reforestation of the upper portions of stream basins. In connection with all such projects arrangements are to made to restrict grazing, without, however, reducing the number of stock except in cases of extreme necessity. It is thought that this can be accomplished by fencing off the better range areas, by reseeding them with good forage plants, by instituting rotation grazing, and by constructing watering places. That grazing regulation is urgently needed in Spain may be judged from the fact that 6,300,000 head of stock, mostly sheep, graze on 12,000,000 acres of public forest. This is three-fourths as many as graze on an area nine times as large in the national forests of the United States.

An Airplane Attack on Pine Moths

The Revue des Eaux et Forêts reports an experiment in destroying pine moths in the forest of Haguenau, Alsace, by scattering arsenate of lime from an airplane. Three parcels with a total area of about 50 hectares were chosen for the experiment. About 1,300 kilos of arsenate were used. The airplane flew at a height of from 3 to 15 meters above the forest, releasing the powder through a hopper. The pilot was guided by panels and pennons and by fires at the angles of the parcels. A time was chosen when the foliage was damp so that the powder would stick to the leaves, as the moths are destroyed not by contact but by eating the powder along with the leaf. About four days after the application dead moths were found on the ground. The success of the experiment was somewhat marred by a heavy rain which fell for two days immediately afterwards and washed away a good deal of the poison before the moths had a chance to sample it. Nevertheless, it was estimated that more than a third of the moths in the parcels were killed. The cost of the experiment was 425 francs per hectare. No harm to game was noted. Several reasons for this are given—the small amount of arsenic in the powder, the small quantity of powder that sifted through the tree tops, the patrol of the area by forest officers during the experiment, and the frightening away of game animals by the noise of the motor of the low-flying plane.

Investment in Canadian Forest Industry

About $666,000,000 is invested in the forest industry of Canada, according to an estimate of the Canadian Department of the Interior quoted in the Pulp and Paper Magazine of Canada. Nearly one-third of this is in lumbering plants and sawmills, the remainder in pulp and paper operations. The annual production from the forests, including finished products, is worth about $440,000,000. Sawmills operating in the Dominion number more than 2,500. The annual cut of lumber approximates 4,000 million board feet. Spruce leads other species in volume of cut and is followed by Douglas fir and white pine.

A fire-weather forecasting research service is to be established in conjunction with the Canadian Meteorological Service. The Minister of Marine and Fisheries has made a special assignment of $12,500 for this purpose.

* * *

The Forest Products Laboratories of the Canadian Department of the Interior are to be moved from Montreal to Ottawa. The pulp and paper division will, however, remain at the present location in Montreal. It is being taken over by the Canadian Pulp and Paper Association, which plans to erect a new building there.

* * *

More than $5,218,000 was collected by the Quebec Department of Lands and Forests during the last fiscal year for timber dues, ground rents, and timber limit sales. This was an increase of nearly $1,000,000 over the previous year.

The use of wood pavement is declining in Pa according to Bois et Resineux. In 1922 about 23 cent of the Paris streets (2,461,700 square meters) w paved with wood. In February, 1927, the total wc paving was 2,175,000 square meters. One wond whether this will make any difference in the consister of the mud splashed copiously over the narrow wa of the Latin quarter to the detriment of stud trousers and skirts whenever a motor bus passes.

* * *

Where the new trunk road between Toronto a Cochrane, Ontario, runs through forested areas, t Ontario Government is having clearings made at 1 mile intervals for camping purposes. These sites a cut back into the brush far enough to provide a sa firebreak, and are being equipped with facilities f building camp fires.

Personals

Henry S. Graves has resigned the provostship of Yale University in order to devote all his time to his activities as dean of the Yale Forest School.

Reginald D. Forbes has been appointed to head the Allegheny Forest Experiment Station soon to be established by the Federal Government in the Middle Atlantic States. Mr. Forbes has directed the Southern Forest Experiment Station, New Orleans, La., since its establishment in 1921. A graduate of the Yale Forest School in the class of 1913, he had early experience in the United States Forest Service and in 1916 became assistant State forester of New Jersey. In 1917 he went to Louisiana as State forester, being the first to hold that position under the law requiring the appointment of a man with technical training in forestry.

E. L. Demmon will serve as the acting director of the Southern Forest Experiment Station until a successor to Mr. Forbes has been appointed.

A. F. Hough has been transferred from the Appalachian Forest Experiment Station to the Allegheny. Mr. Hough is a graduate of the New York State College of Forestry and has spent the past year in graduate work at the Yale Forest School. Another member of the new station's staff is O. M. Wood, formerly technical assistant on the Payette National Forest.

E. F. McCarthy has been appointed director of the forest experiment station that has just been established at Columbus, Ohio, in cooperation with Ohio State University, to serve the Ohio-Mississippi Valley region. Mr. McCarthy has for six years served as silviculturist at the Appalachian Forest Experiment Station, Asheville, N. C. Much of his research in that time has been upon the nature of forest-fi damage and the relation of weather conditions forest fires. He has made intensive studies of yello poplar, oaks, and other principal hardwood trees the Appalachian region, many of which are importa also in the Ohio Valley. Mr. McCarthy's earli experience included nine years' teaching in the Ne York State College of Forestry. His professiona training was received at the University of Michigan.

Bernard S. Meyer, assistant professor of pla physiology at Ohio State University, has accepted position on the staff of the new station. Docto Meyer will report for duty in September. Anothe member of the staff will be Leonard F. Kellogg, forestry graduate of the University of California an of Yale University who has had experience in th national forests of California and at the Appalachia station. A fourth will be J. H. Hanley, a forestr graduate of the University of Michigan.

Arthur M. Sowder has been appointed to the newl created position of extension forester of Idaho. Mr Sowder this year received the degree of master o science in forestry from the forest school of the Uni versity of Idaho. Until July 1, 1928, he will act no only as extension forester but as research assistant i the Idaho Agricultural Experiment Station. His research work, which is being financed from Purnel funds, will deal chiefly with the influence of windbreaks on the yields of field and orchard crops grow under irrigation.

Vance P. Edwardes has left the United States Forest Products Laboratory to take a position with the Northwestern Pulp & Paper Co., Astoria, Oreg., as nager of a 110-ton sulphite plant operating entirely hemlock sawmill waste. Since 1924 Mr. Edwardes s been in charge of commercial contacts of the oratory's pulp and paper section, including its ent promotional work on white-water recovery and ste sulphite liquor disposal. From 1917 to 1921 he d charge of the laboratory's sulphite investigations, d for the following three years he was employed by e Consolidated Water Power & Paper Co. at Apple- n, Wis.

Arthur D. Read, of the Long-Bell Lumber Co., has en transferred to De Ridder, La., where he will ect the establishment of the company's new forest rsery and the planting of several thousand acres of t-over lands in Beauregard Parish. He will also ve charge of improvement thinnings and selection tting in several Long-Bell forest reserves. Mr. ead was for some years a member of the United States rest Service, stationed in the Southwest.

Henry L. McIntyre has been appointed to head the reau of forest pest control in the New York Con- rvation Department. Mr. McIntyre has been in arge of the gipsy moth control work of the New rk Conservation Commission since 1923. Before at he had many years' experience in the gipsy moth ntrol work conducted in the New England States by e Federal Government.

S. A. Graham, assistant professor of forest ento- ology at the University of Minnesota, has accepted associate professorship in that subject at the Uni- rsity of Michigan.

A. E. Wackerman has left the Lake States Forest periment Station to become forester for the Crossett mber Co., at Crossett, Ark.

J. D. Schoeller will leave his post on the Jornada nge Reserve, Las Cruces, N. Mex., about Septem- r 1 to become assistant supervisor of the Plumas ational Forest, Calif. He has been director of the serve for the past three years.

M. R. Tillotson, former supervisor of the Cleveland ational Forest, has been appointed superintendent the Grand Canyon National Park. He has for veral years been engineer of the park.

William B. Greeley, Chief of the United States rest Service, received the honorary degree of doctor laws at the sixty-fourth annual commencement, ay 11, of the University of California. On June 22 received the honorary degree of master of arts from le University.

Austin Cary, logging engineer of the United States rest Service, has been appointed to membership on e forestry advisory council of the Pine Institute of merica.

Lord Clinton has been made chairman of the British restry Commission, succeeding Lord Lovat.

Dr. Yrjö Ilvessalo, professor of forest management in the Finnish Forest Research Institute at Helsinki, has come to America for studies in forest management that will occupy about six months. His first studies will be in the spruce forests of the East. He will visit the Pacific coast, the northern Rocky Mountains, and the Lake States, and will spend several months at Yale.

T. Hosokawa, secretary of the Ministry of Agriculture and Forestry of Japan, has just concluded a tour of Europe and is visiting this country. Here he is making a study of the administration of governmental forestry work, especially of the cooperative work of the Federal and State Governments.

Dr. M. Dracea, a teacher of silvics in the Polytechnic School, Bucharest, has been brought to this country by the Rockefeller Foundation for several months' study in silviculture and forest products. Doctor Dracea spent several weeks at the Yale Forest School, and attended the International Congress of Soil Science at Washington. His later itinerary includes the forests of the southern Appalachians and the Forest Products Laboratory. Before returning to Rumania he will visit Germany and France.

Dr. Heinrich Hesselman of Sweden, with his son, is making an extended tour of the United States under the auspices of the International Education Board. He will visit most of the forest regions of the country and will make local field trips under the guidance of the directors of the forest experiment stations and members of the staffs of various forest schools. He expects to sail for Sweden in September.

W. G. Campbell, who is a fellow of the Commonwealth Foundation (British), has concluded a two years' stay at the United States Forest Products Laboratory, during which he has engaged in research on the fundamental chemistry of wood. He expects to accept an appointment with the Forest Products Research Laboratories of England.

Verne L. Harper, a forestry graduate of the University of California, has been appointed to assist in the naval stores research work conducted by the Southern Forest Experiment Station at Starke, Fla. Other men appointed from this year's junior forester register to research positions in the United States Forest Service are Arland L. McKinney, who goes to the Appalachian station; Edward Mowat, chosen for the Lake States station; and Daniel Pingree, who is joining the taxation inquiry staff.

A. F. Hough, junior forester appointed to the Allegheny Forest Experiment Station, left the United States June 1 to tour Europe with students of the Oxford Imperial Forestry Institute. The tour will occupy at least eight weeks' time and will include the important forestry countries.

Louis J. Pessin has left the staff of the Southern Forest Experiment Station to return to his old position as assistant professor in the Texas Agricultural College.

Members of the Pennsylvania State Forest Commission reappointed by Governor Fisher are Edward Bailey, Henry W. Shoemaker, Mrs. Mary Flinn Lawrence, and Nelson P. Wheeler, jr.

Officers elected by the Georgia Forestry Association to serve during the current year are: President, C. B. Harman; vice presidents, Mrs. M. E. Judd, T. D. Burleigh, and Mrs. Madge Merritt; secretary, Bonnell H. Stone.

Judge Jacob M. Dickinson, of Tennessee, has b elected president of the Izaak Walton League, s ceeding Charles W. Folds of Chicago.

Prof. R. C. Hawley, of the Yale Forest School, sa in June for three months' travel in Switzerland Germany.

William M. Ritter, of Washington, D. C., presid of the Hardwood Manufacturers' Institute, Memp Tenn., has been elected to the board of directors of American Forestry Association to fill the vaca created by the resignation of William B. Greeley, cl of the United States Forest Service.

Bibliography

Forests and Sea Power

By E. N. Munns, United States Forest Service

It is indeed a pleasure to the forester to find his specialty combined under one cover with world history, to read how forests and the lack of forests have played a dominant part in the development of nations. Particularly is this so when the subject is treated in such a scholarly fashion as in R. G. Albion's "Forests and Sea Power." (Harvard Economic Studies. Harvard University Press, 1926.)

Besides the direct influence of forest resources on the power of nations, the book tells of many strange indirect results of this relationship. A Swedish king's prohibition of naval timber exports helped colonize the coast of Maine; the necessity of keeping the Baltic open for the shipment of high quality fir from northern latitudes brought about early developments in international law; the forests of Africa were exploited by decree of Napoleon, to furnish lumber for his invading fleet; and Nelson was crippled at Toulon because members of Parliament were holding out for exorbitant prices for their timber. In earlier centuries oak, like oil in our own times, caused nations to follow special lines in their foreign and domestic policies, to exert diplomatic pressure, and to develop and encourage colonies. Indirectly it was a cause of war.

The prime example of the relationship of forest resources to sea power is, of course, the naval history of Great Britain. For 200 years, from the days when Cromwell ruled England until the Battle of Hampton Roads sounded the knell of wooden ships of war, the heads of the British Navy worried over the nation's shortage of timber. In all Britain there grew no trees suitable for the best masts. Even in Tudor days builders in the royal yards depended for masts on lumber from the Baltic ports. Time and again England sent squadrons to prevent the interruption of this supply, and constantly she provoked doctrines of neutral rights by waylaying these materials on their way to rival dockyards. For a century the fam white pine of New England furnished masts for t British Navy; but this supply was discontinued af the American Revolution—among the causes of whi by the way, were the laws through which Parliame guarded these trees and the manner of their enfor ment.

Dependence on foreign lands for masts had to recognized at the outset, but it was with the great reluctance that England looked to forests beyond t seas for timber to replace her own oak. The wonderf heritage of excellent native oak forests which Engla possessed when Henry VIII ascended the throne w wantonly wasted, partly through royal policy a partly through rival economic demands, until at t time of the Dutch Wars the navy began to suff from their depletion. Measures such as planting a restrictions upon cutting were adopted on the roy forests, but these were so poorly enforced that duri the constant naval warfare of the eighteenth centu the dockyards had to depend upon precarious suppli from private groves. Just as Napoleon began h great attack on British control of the seas, the suppl from the native woodlands definitely fell short of th dockyard demands. Even then, while blockadin squadrons were hampered by the need for repair or r placement of leaking and crippled ships, a timber tru was able to withhold the needed supply. Only throug extraordinary efforts did domestic timber becom available in time to make possible Nelson's success a Trafalgar, and the closing of American and Europea ports prevented the development of an adequat supply of oak. British possessions sending Canadia oak, African mahogany, Australian eucalypts, New Zealand kauri, and Indian teak saved the situation i part. Rot, however, nearly pulverized the whole navy Ships were kept afloat with great difficulty becaus their hulls leaked so badly, bottoms unexpectedly fel out, and vessels hastily constructed rotted befor they were placed in service.

Albion's book serves not only to quicken interest in story but also to show how timber supplies can affect ational policy and welfare. It should be read by eryone interested in forest economics.

Forestry Handbook for Teachers

The more and more general introduction of the ıdy of the forest into secondary and grade schools has eated a need for a forestry guide for trachers. This ed the United States Forest Service has sought to eet by publishing "The Forest: A Handbook for eachers." The author is D. Priscilla Edgerton, w State supervisor of forestry education of Missippi, who bases on long experience as a teacher d as an educational specialist of the Forest Service r advice as to the choice and presentation of forestry ssons for children. This handbook contains material apted to the primary grades and detailed outlines r forest study in each term of the fifth to ninth ades. In addition to subject matter the outlines ve illustrative material, study questions and practical ercises, suggestions for supplementary reading, and rrelations with two or more school subjects such as nguage, geography, history, and general science. ne bulletin suggests many devices for stimulating the ild's interest in trees and forests near his home, and ves directions for a number of simple experiments d practical demonstrations through which the child ay learn something about the forest through "doing d seeing."

A very limited supply of this publication (Misllaneous Circular No. 98-M) is available for free stribution by the Forest Service. Orders will be ed by the Superintendent of Documents, Governent Printing Office, Washington, D. C., at 30 cents a py. If orders received by the Superintendent of ocuments from all sources total 10,000 copies, it will possible to fill orders for 500 or multiples of 500 at e rate of $37.50 per 500.

Suitability of American Woods for Paper Pulp

Woods that may be called upon to substitute for ruce, fir, and hemlock as paper materials are described a new publication of the United States Forest Service titled "The Suitability of American Woods for per Pulp." The bulletin describes standard pulping ethods as related to wood properties and explains the itability of 94 kinds of hardwoods and softwoods for lping by both chemical and mechanical processes. ne information on pulping qualities of individual ecies is presented in a convenient semitabular form, th a description of the behavior of each wood when lped by different processes. Under the common me of each species is given, also, its botanical name, its range, a list of local names applied to it in different parts of the country, its weight per cubic foot, and its fiber length.

Copies of this publication (Department of Agriculture Bulletin 1485) may be obtained, while the supply lasts, from the Forest Products Laboratory, Madison, Wis., or the United States Forest Service, Washington, D. C. Copies will be furnished by the Superintendent of Documents, Government Printing Office, Washington, D. C., at 20 cents a copy.

Natural Replacement of Blight-Killed Chestnut by Other Species

The sequel to the tragedy of the American chestnut's destruction by blight is predicted in a study newly published by the United States Forest Service, "The Natural Replacement of Blight-killed Chestnut." The chestnut, furnishing a greater variety of valuable wood products than any other eastern hardwood, heretofore constituted nearly half of the hardwood forests of New England. New Jersey, and Pennsylvania, as well as a large proportion of the hardwoods of the Appalachian Mountains. When its extinction became practically certain it was thought that these forests would be left with large gaps requiring extensive planting. The investigations on which C. F. Korstian and Paul W. Stickle report in this circular, however, point to a more hopeful view. These men have found that the blanks caused by the death or salvaging of chestnut are rapidly being filled by such valuable trees as the oaks, the hickories, and white ash, which can in many respects take the place of chestnut in manufactures. Although the forests are still far from being fully productive, and will continue to be much below normal for a number of years after the blight has done its work, they are nearly everywhere making satisfactory progress toward recovery from the loss.

Copies of this publication (Miscellaneous Circular No. 100-M) may be obtained at present from the Appalachian Forest Experiment Station, Asheville, N. C.; the Northeastern Forest Experiment Station, Amherst, Mass.; and the United States Forest Service, Washington, D. C. Copies will be sold by the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents a copy.

Yield and Volume Tables for Southern Pine

Normal yield and volume tables for the southern pines are available upon request to the Southern Forest Experiment Station, New Orleans, La. A study of the yields of southern pines was started by the station in 1921, in cooperation with the southern State foresters and the National Research Council. Field work continued for more than four years and extended through the entire range of the southern pines—from

Virginia to Texas, inclusive. New volume tables for second-growth trees have been prepared according to many different utilization standards. Normal yield tables showing the amount of wood produced from fully stocked stands at different ages have been prepared for the various sites on which the species grow. The tables now offered for distribution in mimeographed form are a résumé of those that are later to be printed.

New Douglas Fir Bibliography

The bibliography on Douglas fir issued by the United States Forest Service October 1, 1924, has been supplemented by one compiled by R. E. McArdle of the Pacific Northwest Forest Experiment Station, Portland, Oreg. Copies of the new as well as of the old list may be obtained by writing to the Washington, D. C., office of the Forest Service.

Correction

When the United States Forest Service first published Miss Edith R. Mosher's verses entitled "What Do We Burn When We Burn Our Trees?" in the American Forest Week program for the use of schools and children's organizations, the verses were erroneously attributed to Stoddard. In the program published by the Forest Service in 1926 these verses were reprinted with a note in regard to the previous error as to their authorship. Miss Mosher now writes that she has seen the verses in several recent publications incorrectly attributed. The Forest Service will be grateful if readers of the Forest Worker make sure not to perpetuate this error.

It should be noted also that in Miss Mosher's original the first line ends with the word "tree," not with "trees" as in the Forest Service publication. The first stanza of the verses is as follows:

> What do we burn when we burn our tree?
> We burn the home for you and me,
> We burn the carriage house, barn, and shed,
> The baby's cradle, the little boy's sled,
> The bookcase, the table, the rocker of ease,
> We burn all these when we burn our trees.

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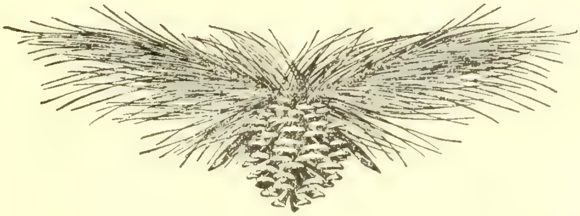
FOREST WORKER



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Announcements

Ohio Valley State Parks Conference

The third Ohio Valley regional conference on State parks will be held in Cincinnati, Ohio, October 18–20, inclusive. Headquarters will be at the Hotel Alms.

State Foresters to Meet at Hartford, Conn.

The Association of State Foresters will hold its annual meeting at Hartford, Conn., October 3–6, inclusive, under the auspices of State Forester Hawes, who is president of the association.

Hearing on Rosin Standards

A public hearing on proposed standards for rosin in which the predominating color is red will be given by the Food, Drug, and Insecticide Administration, United States Department of Agriculture, on November 1, 1927, at 10 a. m. The proposed standards consist of two combinations of Lovibond glasses assembled in a form similar to the existing official standards for rosin. The color combinations of the proposed standards are as follows: No. 1—15 yellow, plus 100 red, plus 1 blue; No. 2—20 yellow, plus 165 red, plus 2 blue.

The hearing will be given at 216 Thirteenth Street SW., Washington, D. C.

Waste-Prevention Prize Contest

The National Lumber Manufacturers' Association announces another waste-prevention contest, to close March 1, 1928. Persons engaged in or connected with the manufacture of lumber and other sawmill products, and employees of timberland owners, are invited to submit devices and methods for preventing waste in logging and milling. Methods and devices that now on the market or that are serving as a seconda source of income of men employed in the lumb manufacturing industry are barred. For the fi time, safety devices will be admitted. Prizes are offe as follows: First, $750; second, $500; third, $2 three of $100 each; and four of $50 each. A statement of the conditions of the contest can be tained by writing to the National Lumber Ma facturers' Association, Transportation Building, Wa ington, D. C.

Forest Ranger Examination

The Civil Service Commission announces an exa nation for forest ranger to be held the latter part October in Arizona, California, Colorado, Ida Minnesota, Montana, Nevada, New Mexico, Oreg South Dakota, Utah, Washington, and Wyomi Vacancies in the Forest Service in these States, and positions requiring similar qualifications, will be fil from this examination. The law requires that rang shall be selected, when practicable, from am qualified citizens of the State in which the fores situated, and preference will be given accordingly certifying eligibles from the list of those who pass examination. The entrance salary ranges from $1, to $2,000 a year, according to the economic conditi in the locality, the character of the activities conduc on the ranger district, and the degree of responsibili

Applications to take the examination should re the Civil Service Commission, Washington, D. C., later than October 14, 1927. The examination be held on October 25 at the national forest he quarters in the States named. Those interested sho write to the Civil Service Commission for an announ ment of the examination and for Form 2600 on wh to make application.

Because the edition of this periodical is necessarily limited, its free distribution outside of the Government service is restricted to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

Material offered for publication in the Forest Worker should be addressed to the Editor, United States Forest Service, Washington, D. C.

FOREST WORKER

Washington, D. C. SEPTEMBER, 1927 Vol. 3, No. 5

State Forestry

The 1926 Fire Score

Forest fires caused damage amounting to $26,912,295 the United States last year. This immense loss is e result of 91,793 fires which burned over 24,316,133 cres of the lands of the country.

More than 72 per cent of the fires are known to have een caused by man, and 12 per cent by lightning; e causes of a little over 15 per cent are unknown. mokers lead all others as starters of forest fires with known total of 5,625, or over 16 per cent of all, ilroads come next with 13 per cent, and brush urning third with 12 per cent.

The State of Mississippi, with 23,170, suffered more es than any other State. Alabama was next with ,953, and Georgia was third with 6,446. At the her end of the scale, Delaware had but 37 fires, hode Island 43, and Vermont 73.

The Southeastern States as a group—the Carolinas, eorgia, Florida, Alabama, and Mississippi—had the ost fires, 54,200. The West Mississippi States, ich include Missouri, Arkansas, Oklahoma, Louisia, and Texas, came next with 10,657 fires. The ortheastern States had 6,251 fires, the Appalachian ates 4,827, the East Mississippi States 1,747, the ke States 3,326, the Rocky Mountain States 3,877, d the Pacific States 6,842.

Where protective systems were functioning in 1926 arly 61 per cent of all fires were confined to areas of s than 10 acres, and less than 2 per cent exceeded 00 acres. Within the protected areas as a whole e average fire burned over 140 acres, as against an licated average of 337 acres per fire on lands without otection.

In the protected forests of Arizona the average fire vered only 2.4 acres, in Colorado 7.9 acres, New exico 10.3 acres, Vermont 12.4, Wyoming 13.4, w Hampshire 16.7 acres. In Florida, with only a ry small protected area, the average fire burned er 373 acres. The Wisconsin average for protected a was 355 acres, Minnesota 354, and California 333. nnsylvania held the average fire to 77 acres, New rk to 56 acres. Virginia's fires averaged 161 acres, ryland's 116, and West Virginia's 53.

Within the areas under protection the 33,867 fires orted burned over about 1,040,000 acres of merchantable timber, 1,682,000 acres of nonmerchantable or immature tree growth and 1,394,000 acres with no tree growth at the time, the total area of forest land burned thus reaching 4,116,000 acres. Including the unprotected regions 24,316,133 acres of forest land were scourged by fire during the year.

Wisconsin Changes Conservation Organization

The office of commissioner of conservation of Wisconsin has been replaced by a State conservation commission of six members empowered to employ a director for the State conservation department. Greatly enlarged powers and duties in regard to forest fire protection are given to the new body.

An interim committee composed of members of the legislature has been created to investigate the forestry situation in the State. Under the constitutional amendment ratified this spring, a measure has been adopted making land devoted to the growing of timber subject to a specific annual tax, which is to be paid to the town treasurer, the State advancing 50 per cent of the amount. The timber on the land remains free from taxation until it is mature, when a severance tax is paid to the State. Other recent laws of Wisconsin empower county boards to acquire lands and administer them as county forest reserves, and increase the authorization for the acquisition of lands within the State for national forests from 100,000 acres to 500,000 acres.

Maryland Organizes Forest Districts

The Maryland Department of Forestry has apportioned the State into three forest districts and on October 1 will place a district forester in charge of its activities in each. Districts 1, 2, and 3 comprise the western, central, and eastern parts of the State, respectively, and have their headquarters at Cumberland, Upper Marlboro, and Salisbury. The men who will take charge as district foresters, in the same order, are: C. Cyril Klein, now district forest warden, Maryland; Walter J. Quick, jr., district forest ranger, Shenandoah National Forest; and Alfred A. Doppel, extension forester for Connecticut.

Fire Protection and Forestry Study Measures Passed in California

California has taken an important step in forest fire protection by cutting off the first 15 days of the open season for deer in the Sierras from the Tehachapi north to the Siskiyou and Lassen County lines. The opening of the season is thus advanced to September 16. Other measures adopted by the State for forest protection make the building of fires on posted lands a misdemeanor and give the director of the department of natural resources authority, with the governor's consent, to declare any area in any State park or forestry tract closed to camping.

Another new law of California authorizes boards of school trustees and city boards of education to institute courses in forestry in the public schools. The expenses that may be incurred under this authority include not only the employment of instructors and supervisors and the purchase of equipment but the lease or purchase of lands for school forests, which may be outside the district boundaries. It is provided that in connection with forestry work the school authorities may enter into contracts and agreements with the governments of the United States, the State, and any political subdivision thereof.

Forest Planting in Nebraska

Forest planting still proceeds at a good pace in Nebraska, native State of Arbor Day and home of the Halsey nursery. Extension Forester Watkins reports that 2,736,000 forest trees were planted in the State this spring, of which 186,000 were distributed under a Clarke-McNary agreement and 200,000 under the provisions of the Kinkaid law. The United States Forest Service planted 1,500,000 on the Nebraska National Forest, commercial nurseries of Nebraska furnished 750,000, and native stock and nursery trees brought from outside the State made up approximately 100,000.

California Counties Appropriate Funds for Fire Protection

Santa Barbara County, Calif., has pledged $10,000 to the construction and maintenance of forest fire protection improvements in the present fiscal year. This represents an increase of $3,000 over the amount expended for this purpose during the previous year. In this work the county cooperates with the United States Forest Service.

San Diego County this year is extending its plan of cooperation with the Forest Service to include reforestation work. For this purpose 1 cent on each $100 valuation will be added to the tax rate. This tax for reforestation work will be in addition to the 2-cent levy already in effect for forest fire protection.

Clarke-McNary Cooperation in Planti Stock Distribution

Thirty-two States, Hawaii, and Porto Rico are n cooperating with the Federal Government in t production and distribution of forest planting sto under section 4 of the Clarke-McNary law. O new State, Montana, was added to the list during t past fiscal year. It is anticipated that agreeme with Tennessee and Mississippi will soon be execut and that the previous agreements with Delaware a Minnesota will be renewed. State and Federal fun budgeted for this work during the fiscal year 19 amount to $320,000, which is $35,000 more than t total made available for the purpose in the precedi year.

New Forest Reserves in Hawaii

Additions to the forest reserves of the Hawaii Islands amounting to 34,957 acres have been made proclamation of the Governor. They include 4 n reserves on the island of Hawaii, 4 additions to existi reserves on the same island, 3 additions to the reserv on Oahu, and 1 addition in Kauai. These new reserv and additions to the old ones bring the total of for reserves in the islands up to 916,976 acres.

Pennsylvania Appropriates Funds for Ne State Forest Park

An appropriation of $450,000 has been provided the Pennsylvania Legislature toward the purchase the Cook Forest, a tract of 7,219 acres of which tween 500 and 600 acres are virgin forest. T money is to be so expended only if $200,000 of priva funds is paid into the State treasury as a contributi toward the purchase. If the land is bought by t State it will be used as a State forest park.

Northern New York Association Plans Reforestation Work

Representatives from the 19 northern counties New York State recently met in Ogdensburg a formed the Association for the Utilization of t Natural Resources of Northern New York. The p pose of this body is to work out systematic plans "the proper development, wise utilization, and ext sive advertisement" of the region's natural resourc It was agreed that the first step in this direction sho be reforestation of idle and waste lands. A plan w adopted for planting forest trees on 100,000 acres year for 10 years, and the financing of this plan w assured.

xperimental Plantings at University of Virginia

Experimental forest-tree plantings were made this ear on the grounds of the University of Virginia, under plan of the Virginia Forest Service that calls for ch plantings in various parts of the State. Every cies that seems to have economic value as a forest ee in the State is to be used. Groups of quarter-acre ots, each plot in a group being planted with a differ- t species, are to be so located as to permit comparison the growth of each species under a variety of vironmental conditions.

Larger Forestry Appropriation in Texas

Appropriations made by the Texas Legislature for e State's forestry work during the two years begin- ng September 1, 1927, are about $30,000 larger than ose of the preceding biennium. They total $130,700. item of $25,000 is provided, on condition that it be atched by private subscription, toward the purchase a tract of virgin longleaf pine timberland to be used a State forest park.

alifornia Traffic Officers to Fight Fire

The 200 traffic officers of California have assumed duties of preventing and reporting forest fires, der an agreement between the State forester and chief of the State motor vehicle department. The ffic men will fight grass fires along the highways will report forest fires to forest officers. They pay special attention to persons who throw burning acco or matches from moving vehicles.

* * *

State forest officers of Massachusetts are now author- d to take entire charge of fires that get beyond the trol of local forest wardens, engaging all necessary o and equipment. Expenses incurred in fighting h a fire after the State officer takes charge are to divided equally between the town and the Com- nwealth.

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ax homestead lands in Michigan that are suitable State forests and other public reservations may be held from homestead entry and sale, under author- of a law enacted by the legislature at its session of 1 7.

* * *

he Legislature of Washington has authorized the eptance by the State for State forest purposes of able lands acquired by any county through fore- ure of tax liens or otherwise.

More Municipal Forests for Vermont

The number of the municipal forests of Vermont has now swelled to 38, and their area to 8,000 acres. The city of Rutland has approximately doubled the area of its forest by a recent purchase of 1,500 acres. The town of Woodstock has received land for a forest as a gift from ex-Gov. Franklin S. Billings. Forest plantings by 18 of the cities, villages, and towns this spring called for 269,000 trees.

Interim Commission Studies Minnesota Forestry Needs

The interim commission created by the Minnesota Legislature at its 1927 session to study the State's forestry needs devoted the period August 12–20 to an observational trip through the northern part of the State. They visited lumbering operations, the Cloquet Forest Experiment Station, and virgin timber, second-growth, and burned-over areas. The commission includes one senator and one member of the house from each congressional district and one member at large, and is headed by W. I. Nolan.

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A survey of the resources and industries of North Carolina is being made by the State department of conservation and development. Park Mathewson, formerly head of the budget bureau of New York City, is in charge of the work. In considering the subject of natural resources the survey will cover raw materials, labor, water power, climate and health, highways, education, taxes, and transportation.

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Exceptionally bad fire weather in Vermont this spring led to a proclamation by the governor forbidding the building of fires on or near forest land. The issuance of this order on April 16 was followed by a marked decrease in the number of fires. The woodlands of New Hampshire were closed for 10 days in April by proclamation of the governor, the warning being given to the public by radio.

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New Hampshire Forests, the quarterly news letter of the New Hampshire Forestry Department, now appears in print and with illustrations. The printing is paid for through the sale of advertising space. The periodical's chief purpose is to supply forestry news and information of value to the department's employees. In addition it carries material of interest to lumbermen, including lumber prices.

Education and Extension

Bogalusa Camp of Louisiana Forest School Dedicated

The camp buildings of the forest school of the Louisiana State University were dedicated July 2. The camp is located 10 miles from Bogalusa, La., on the 1,000-acre forest given to the school by the Great Southern Lumber Co. J. K. Johnson, forester for the Great Southern Lumber Co., presided at the dedication. A crowd of about 1,000 attended the exercises and was addressed by officers of the university, the State, and the forestry organizations of the United States, Louisiana, and Mississippi. Among the guests was Dr. Heinrich Hesselman, director of the Swedish Forest Experiment Station.

This camp is not intended for summer use alone, but will be used off and on throughout the year. For example, Professor Markworth plans to have a number of students there this fall collecting longleaf pine seed, of which a heavy crop is promised. In the spring students will use the camp while engaged in planting work on the school forest.

Western Business Advertises Forest Fire Prevention

Reports from the Western States indicate that he who runs there this year can hardly help reading, and being convinced, that forest fires should be prevented. Corporations and commercial houses are joining with energy in the effort to spread this idea. Scattered instances of their cooperative work are the following:

The Richfield Oil Co. has issued for use in the street cars of San Francisco, Oakland, San Diego, and Portland a large colored poster showing a burning forest, with the legend "Help Prevent This—Be Careful." This company has also issued an advertisement "In the Path of a Match," to be run in color on the back covers of Pacific coast magazines and in black and white in coast newspapers.

The Southern California Edison Co., in cooperation with the supervisor of the Santa Barbara National Forest, has issued a windshield sticker consisting of a 3-inch Forest Service shield in green overlaid with the legend "Help Prevent Fires" in white and bearing smoking and camp fire rules on the reverse side. The company planned to use these stickers on its 1,200 automobiles operating in southern California, and offered to lend its plate to any other company.

The Pacific Telephone Co., in cooperation with the California Development Association, distributed 50,000 copies of a five-color poster entitled "Sentinels of Forest Safety," featuring a forest ranger and calling on t public to report fires.

The Standard Oil Co. of California in cooperat with the Forest Service issued a new 13 by 20 i "Save the Forests" fire poster in red, white, and bl Two thousand copies of the poster were issued for play at service stations and 20,000 copies of a 3 b inch reproduction, with fire rules on the back, w printed for distribution to motorists.

The Southern Pacific Railway has arranged to fire slogans on its menus, changing them several ti each month.

The Santa Fe Railroad has decided to conti throughout the year the fire-prevention display in time folders which it has heretofore carried during summer.

McCredie Hot Springs, Oreg., at the suggestion forest officers of the Cascade National Forest, this y runs a red shield and fire warning on its writing pa and envelopes, and a slogan in red on its advertis cards and hotel rate cards.

The Daly-Seegar Co., hotel printers and adverti of San Francisco, this summer printed a large sup of cards, 5 by 11 inches, carrying three Forest Ser photographs showing timber, a fire, and a burned-o area, and a forest protection plea. These cards w to be sent out to all summer resorts in Califor Washington, and Oregon, in special envelopes rea "Do your bit—Tack 'em up."

Minnesota Training Course for Boy Sc Leaders

The eighth session of the University of Minneso training course for Boy Scout leaders was comple on August 12 with the granting of certificates to ab 40 men. This course is carried on at the sum quarters of the university's division of forestry Itasca Park. The students are executives, sc masters, and assistant scoutmasters of Minnesota of North and South Dakota; the teachers are nati and regional scout officers and members of the fac of the forestry division. Half of the work of the co is in scouting and half in forestry and woodcraft.

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The scientific library and personal herbarium of late George B. Sudworth have in accordance with wish been given to the School of Forestry and Con vation of the University of Michigan. The gift incl between 800 and 900 books and pamphlets and n than 1,000 mounted specimens.

ew Hampshire Boys Get Prizes for Forestry Work

In efforts to interest farm children of New Hamp- ire in forestry work the Society for the Protection of ew Hampshire Forests and the Agricultural Extension rvice are working side by side, with excellent results. e Four-H clubs of the State, which in 1926 had 40 restry workers, now have 250. This year the ildren have planted 166,000 pine trees, and in dition have taken an active part in improving their me woodlands and in protecting them from fire d from white pine blister rust.

In each of about 20 counties a series of gold, silver, d bronze medals provided by the society were arded this year to individual boys and girls for tstanding results in establishing forest plantations d improving woodlands. In each of the counties, o, the club that did the best forestry work as a oup was rewarded by the society with the privilege having two of its members taken to a forestry ining camp held in August in connection with the ate university's farmers' week. In this way 40 ys went to Durham, as guests of the society, and d instruction in forestry from Professor Woodward the university and Extension Forester Barraclough.

The boys of the East Jeffrey club, which won the ze for Chester County, worked for 50 cents a day nning and improving a second-growth white pine ods on the outskirts of the village. A boy near lfboro won a gold medal for thinning and pruning rly an acre of growing pine during the winter, and ilver medal for planting 2,000 white pines on an ndoned field with some help from his father. other prize-winner thinned and pruned more than cres of growing pines and planted 3,000 trees.

say Contest Open to Georgia School Children

All children in the grammar and high schools of orgia are invited by the Georgia Forestry Associa- n to enter a forestry essay contest that will close on anksgiving Day, 1927. The essays are to be based information contained in or suggested by the For- y Primer published by the American Tree Associa- n. Prizes will be awarded just before Christmas. enty-nine high-school pupils will receive prizes of n $1 to $50 and 43 grade pupils will receive from o $25 apiece.

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ounty fairs in 23 counties of New York State this will have exhibits showing reforestation. A ndard exhibit has been prepared by the State con- ation department.

Planting Campaign in New Jersey

Extension Forester E. L. Scovell, of New Jersey, made his plans six months ahead of time for this spring's forest planting. Through the fall and early winter months he carefully studied the land use situation in Morris, Warren, and Sussex Counties, in cooperation with the county agents, and assembled silvicultural information applicable in these counties. On this basis a planting campaign was arranged for each of the counties, including the appointment of local committees, essay contests, exhibits, meetings, and demonstrations, and leading up to the proposal to individal landowners that they pledge themselves to a certain amount of planting. The effectiveness of the early-matured plans may be judged from the planting reports of the three counties for 1926 and 1927:

County	1926		1927	
	Number of planters	Number of trees planted	Number of planters	Number of trees planted
Morris	25	126,000	39	186,000
Warren	5	23,000	27	58,000
Sussex	12	76,000	28	99,000
Total	42	225,000	94	343,000

The totals for the three counties show an increase of 124 per cent in the number of planters and an increase of 52 per cent in the number of trees set out.

Farmers Study Forestry at County Leader School

Twelve farmers of Carlton County, Minn., took a course in forestry as a phase of farm management at a county leader training school held during the past winter. One day a month for four months, from December through March, they met with William Cavert, extension specialist in farm management and economics, and Parker Anderson, extension forester. Each of these farmers carried back what he learned to a group of his neighbors.

In the first lesson Mr. Cavert discussed the plan for the farmstead, bringing out points in the arrangement of fields and location of buildings that facilitate the work of the farm. Mr. Anderson followed with a description of windbreaks and shelter belts as features of the farm plan. In the second lesson the farm-management specialist discussed field arrangement and crop rotation and the extension forester gave a talk on the growing and planting of trees and some of the principles of landscape arrangement. In lesson three Mr. Anderson presented woodland management, and in lesson four the utilization of farm timber.

The work of this school was so successful that Mr. Anderson hopes during the coming year to repeat it in several other counties.

Forestry Exhibit at Transcontinental Highways Exposition

An open-handed friend of forestry enabled the San Francisco office of the United States Forest Service to put on an unusual exhibit at the Transcontinental Highways Exposition in Reno, Nev., this summer. W. A. Shepard, California commissioner at the exposition, footed the bill of about $800 for an exhibit occupying a space 37 feet long and 20 feet deep facing the main entrance of the California building. Half the set was a green forest scene with living trees, needle-covered floor, a waterfall, and a lake. A painted background of forests and mountains and a foreground realistically arranged with ferns, moss, old logs, rocks, and pine cones completed the picture, which was enlivened by a mallard duck and ducklings and a flock of quail. The other half of the exhibit gave a glimpse of a burned-over forest, featuring blackened stumps and a floor of bare rocks and ashes, the skeleton of a deer, and a fragment of a "Help Prevent Fires" sign. The walls of an aisle leading from the exhibit bore large fire signs variously worded. Cooperators in addition to Mr. Shepard were the fish and game commissions of California and Nevada, the Nevada State Highway Commission, and the Hobart Estate Co.

North Dakota Farmers Prepare for She Belt Planting

Sixty farmers of Mountrail County, N. Dak., planning to add to the appearance and comfor their homes by planting shelter belts next spring. most cases the land has lain fallow all summer. F tically every one of the plantings will be located on north and west side of the farm buildings, not than 100 feet from them. According to the u plan the trees and shrubs will be placed 6 feet apar 10 rows 10 feet apart, and the shelter belts will be feet wide and from 300 to 400 feet deep on each In many cases it is planned to have orchards gardens just inside the shelter belts. Four of 60 farmers, as a reward for the best work in selec and preparing sites, will have their planting done w out charge by the North Dakota School of Fores Bottineau.

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The Erie branch of the Pennsylvania Forestry A ciation this spring offered to supply every rural sc in Erie County with tree seedlings to be plantec Arbor Day. Thirty-eight schools accepted the and received 7,800 trees.

Forest Service Notes

The Part of Forestry in Flood Control

(Excerpts from an address by W. B. GREELEY, United States Forest Service, at the Mississippi Flood Control Conference, Chicago, June 3, 1927)

The first thing needed in trying to stop floods by tree growth is to drop all exaggerations about it. It is not true that serious floods are due to deforestation. They occurred when the virgin timber on the Mississippi basin had scarcely felt an axe. It is equally untrue that forests have no bearing upon stream flow. A deal of concrete evidence shows that they have.

The Mississippi basin contains about 89,000,000 acres of forested or denuded land which has little or no utility except in growing timber. No one can assert that the condition of this vast land surface, or the degree of care or of neglect which it receives, have no bearing upon the flow of the Mississippi River.

We must approach this question with sanity and common sense. Forests do hold back flood discharges; but they can not prevent large floods when heavy rains occur. Any reservoir overflows when it receives more water than it can hold. Likewise, forested land overflows after it has become fully saturated with rain. Furthermore, any benefits derived from reforestation can not be secured over night. They will come about only through a long space of time.

Hence forests can not be substituted for the engin ing structures upon which our main reliance mus placed for controlling heavy flood discharges. T can supplement dams or levees, but can not take t place. In dealing with this problem, forestry sh be the handmaiden of engineering; but as a ha maiden it has a valuable service to offer.

In the first place, forests cause a more gra melting of snow. Forests moderate both extreme temperature. They are warmer than open lanc winter and cooler in summer. As spring comes snow melting may begin earlier in the woods. On other hand, it usually lasts longer in the woods tha exposed ground. The common effect of forest co borne out by many observations, is to retard melting of snow after warm weather sets in.

Because of their moderating effect on extreme both heat and cold and their mulch of ground lit the soil freezes less readily under forests than in o spaces. Hence in the colder regions forest soils kept more mellow and better able to absorb w released during the first warm days of spring.

In the second place, forests reduce erosion. vegetative cover tends to reduce erosion. But for usually perform this function more effectively permanently than any other type of vegetation. T is because of the thick mulch of leaf litter and branc hich they drop upon the ground. Furthermore, they re constantly feeding humus into the soil itself, in- reasing its porosity and binding its mineral con- ituents. And the mass of roots of the trees and rubs have an enormous binding power of their own.

The actual effect of forests upon erosion can not be uged without considering other factors, particularly e character of the soil and topography. The streams the northern Lake States, for example, largely drain rous soils containing much sand and fine gravel. hese soils have a high humus content, thanks to the ands of pine and spruce and hemlock which once vered them. Their drainage basins contain much ke and swamp storage and receive a heavy snowfall. l these facts tend to keep them clear, regardless of e presence or absence of forests to-day. Hence the ississippi River above St. Paul, with a basin of 19,585 uare miles, carries a yearly silt discharge of only 7,000 tons.

The Tennessee River, on the other hand, with a catch- ent area less than twice as great, carries an annual t burden of 11,000,000 tons. The Appalachian gion which it drains is a country of light snowfall d of irregular and often concentrated rains. It ntains few lakes, but is made up chiefly of heavy, mpact soils which easily erode. On such basins, ests exert their maximum influence in reducing sion. And what is true of the Tennessee applies ually to many of the middle and lower tributaries the Mississippi which drain the Appalachian and ark regions and the lower hills around them.

The Mississippi receives an enormous flow of water o from the eastern slopes of the Rocky Mountains l from the Great Plains. The mountain tributaries these rivers are mainly clear. They are partly ested and fed chiefly by springs or melting snow. t, with their inflow from the treeless plains, these ers undergo violent fluctuations between high and water stages. From the plains they gather in an rmous volume of silt, causing channel bars, mean- ing currents, and constant undercutting of the ks. The Missouri River, above Ruegg, Mo., ries a yearly load of 176,000,000 tons of silt. No sible forms of vegetative cover could overcome se conditions; but the extension of forests and better servation of range plants would somewhat moderate m.

he gullying of abandoned fields and of logged-off burned-out woodlands on the slopes of the Appa- ians has been striking. So was the washing of from the forested area in Tennessee that was killed years ago by the Ducktown smelter fumes. The ing off of forest cover on a small watershed in orado, although in a region of coarse, permeable increased the volume of silt discharged eight and half times and increased the flood silt load twelve es. The burning out of a small brush-covered yon in southern California in 1914 was followed a silt discharge in a single year of 100,000 cubic yards of soil from a basin containing little more than 1 square mile. Disastrous erosion has followed every forest or brush fire in the rugged gorges of southern California.

Aside from slowing up the melting of snow and reducing erosion, forests do, in some measure, create a surface reservoir that holds back part of the rain and feeds it into the streams more slowly. The trees and bushes themselves intercept some of the rain and delay its progress to the earth. The mat of litter found under thrifty, unburned forests, sometimes only a few inches deep, sometimes a foot or more, acts like a sponge. It absorbs water until it can hold no more. The water-absorbing capacity of the soil itself is greatly increased by the constant accretions of decaying humus. And innumerable little drainage tubes into the subsoil are formed by the roots of trees and brush.

The storage capacity of forests can not be measured in exact terms. Yet there is ample proof that such an influence is exerted by tree growth as well as by other forms of vegetation.

Several years ago a disastrous flood at Pueblo, Colo., was caused by local cloudbursts. In the canyons most completely denuded, the crest of this flood occurred within six hours from the start of the storm. In the forested canyons which received the same rain, the flood crest was not reached until from 18 to 48 hours after the beginning of the storm, and the damage resulting was materially less.

A study made by the Forest Service in southern California showed that within three years after the brush cover on a canyon drainage was destroyed by fire, the soil lost 45 per cent of its water-absorbing capacity. This was due partly to the direct loss of humus and litter and partly to the rapid erosion of the surface soil, exposing the more compact and impermeable subsoil. The value of forest and brush cover to stream flow is so well recognized in southern California, where stored water is the life blood of agriculture, that all agencies, Federal, State, and county, have joined with the water users in a $2,000,000 program for protecting and extending the vegetative cover on their watersheds.

A study made by Professor Bode in Iowa in 1921 showed that even small woodlots in a prairie region have a decided influence upon the absorption of water by the soil beneath them. Not only the average but the maximum and minimum water contents of the woodlot soils were found to be greater than those of soils of the same character and slope in open prairie and farm land.

Now what can be done to bring the protecting and conserving influence of forests to bear most effectively upon the Mississippi floods?

Every forest fire in the Mississippi basin tends, sooner or later, to augment flood conditions. Every abandoned or neglected piece of poor hillside farm land has the same tendency. Destructive lumbering and overgrazing, which leave naked soil behind them, are sure to contribute, at one time or another, to some flood crest. Some of these conditions can only be remedied by the type of educational extension in agriculture and forestry now being conducted by most of the States in cooperation with the Federal Department of Agriculture. Some of them can be remedied by more direct means.

In the main, the existing Federal laws are adequate. We have a law under which the National Government cooperates with any State in the systematic protection of forested and denuded areas from fire. The law is all right; but we need more actual protection under its terms.

We have a law under which the National Government cooperates with any State in promoting tree planting on farms, by furnishing the planting stock. This is precisely what is needed—for flood control—on a large acreage of abandoned or worn-out hill farm land in the Mississippi Basin. The law is sound, but we need a great deal more timber planting under its terms.

We have laws under which national forests may be created anywhere on the drainage of a navigable river. These laws are adequate. The Government has established and is extending national forests on several watersheds within the Mississippi Basin. But we need many more of them. And we need many more State forests to supplement those in national ownership. They will pay good dividends in timber growth and forest industries, aside from their benefits to flood control. But public forest ownership is particularly urgent and warranted on critical areas of denuded or eroded lands which are direct sources of destructive floods.

On the western tributaries of the Mississippi, there is an enormous acreage of grazing land in the open public domain. Grazing on these areas is wholly uncontrolled and usually excessive. An experiment in Utah made by the Forest Service showed that the run-off from rainstorms on overgrazed land was seven times as great as on adjacent areas that were moderately and conservatively grazed. Reduction of erosion is one of the clearly recognized aims of grazing control in the national forests. The Secretary of the Interior has strongly recommended that grazing on the open public domain be also placed under regulation. It should directly benefit the conservation of forage and the stability of the livestock industry. And it can not be left out of our present consideration of ways and means for reducing floods.

Nor should we overlook the natural storage afforded by swamps and overflow bottoms on the upper tributaries of the Mississippi. The drainage of swamps and overflowed lands, destroying natural water storage for the sake of precarious and often unsuccessful farming, has gone too far. Some of these areas should be restored to their natural storage function and their additional service as breeding grounds for fish, water fowl, and fur-bearing animals. Let us have fewer attempts at ill-advised agriculture and more swampland fish and bird reserves like the Winishik botto along the Mississippi.

All of these elements in the problem, forestry cluded, bring us down to the bed rock of rational a productive use of land. It offers many public bene aside from flood control. It offers a future supply timber, the conservation of forage, the saving of s fertility, the profitable use of idle land, the preser tion of valuable wild life, and a more diversified a stable agriculture. Flood control may, if you plea be regarded as a by-product of other national bene from the effective use of land.

Let us see the picture in its true proportions. checks upon big floods, forestry and its allied forms natural storage take a secondary place. They belo "upstage." Immediate relief must be sought throu the skill of the engineer. But behind and suppleme ing the levees or other structures that must be bu we get back to the land. And we should not fail restore, as far as it may be done, the natural stor and protection from erosion that may be derived fr common sense and practical wisdom in our everyd use of land.

Federal Court Enters Decree in Kaib Deer Case

In a recent decree the United States District Co for the District of Arizona, northern division, p manently enjoined State and county officials of Arizo from interfering in any way with forest officers a other agents of the Federal Government in carrying the regulations and orders of the Secretary of Ag culture for reducing the number of deer upon Kaibab National Forest and the Grand Canyon G Preserve. The only limitation placed upon the F eral Government by the decree is that private hunt can not be licensed by the Secretary of Agriculture kill the deer, except in conformity with the spec requirements of the State's game law. However, t limitation does not apply to forest officers and ot agents of the United States.

This case dates from the fall of 1925, and ar because of interference or threatened interference State and county officers with those engaged in red ing the deer herd under orders from the Secretary Agriculture and the Forester. Representatives of State claimed that the local game laws must prev over such orders.

The United States filed a bill in equity asking district court to enjoin county and State authori from carrying out their announced purpose or in a manner interfering with the Government plan throu the enforcement of State laws or otherwise. Jud Ross, in delivering the opinion of the court, said th regardless of whether the deer are the property the State or of the United States "there can be doubt of the right of the Government of the Unit States to do whatever is necessary for it to do upon wn property to protect it from the depredations com-lained of, including the killing or removal of whatever umber of deer as may be necessary, without any egard to the game laws of the State of Arizona."

At the time when the Grand Canyon National ame Preserve was created in 1906 the Kaibab deer erd numbered approximately 3,000 head, but in 25 it had increased to more than 30,000 head. rough extended investigations it was found that e deer were overstocking the range and consuming large part of the forage best adapted for their winter ed and were also injuring and damaging the national-rest lands by overbrowsing and killing young tree owth, shrubs, bushes, and other forage plants. ior to the issuance of the decree by the district urt it was the belief of those most familiar with the uation that regulated hunting on the area afforded e most feasible means of reducing the herd and thus eventing starvation of the deer and injury to the rest.

Hunting by private persons will be permitted during tober of this year under a cooperative arrangement ently entered into between the State game warden d the district forester, Ogden, Utah. Each hunter o obtains a State license and pays the United States .50 to reimburse the Forest Service for the cost of ministration will be permitted to kill one buck er. The State and Federal authorities will exercise nt administrative control of the hunting.

xperiments in Tapping Jeffrey Pine for Heptane

The California Chemical Corporation, under a recent reement, is tapping Jeffrey pine timber on the Lassen tional Forest, Calif., for heptane. The work is being perintended by E. C. Shaler, formerly a forest ranger the Sierra National Forest. In connection with this eration the Forest Service will make studies of the ults of different methods of tapping, the forest oducts staff of the San Francisco office investigating ir effect on yield and the California Forest Experi-nt Station their effect on the health and growth of trees. The Forest Products Laboratory at Madi-, Wis., will cooperate, especially in the analysis of oresin. The experimental work will be under the ection of N. C. Tihomiroff, a young Russian ex-ienced in similar work.

The experimental area is located on the east side of Sierras, about 40 miles from Susanville, on the sale a of the Fruit Grower's Supply Co.

difficulty in cupping for heptane for which no nterpart exists in turpentine operations arises from fact that information is lacking as to just where, the intergrading tree forms between the typical rey pine and the typical western yellow pine, the tane characteristic of the former gives way to the penes characteristic of the latter.

Douglas Fir Has Long Seasonal Seeding Period

Recent investigations by Leo A. Isaac of the Pacific Northwest Forest Experiment Station have shown that the period during which the seed of Douglas fir is disseminated is much longer than has generally been supposed. Douglas fir seed becomes thoroughly ripe early in September. The cones begin to open about the middle of September, and within that month there occurs a heavy dissemination that has usually been supposed to be complete. It is now found that the cones, which for the most part cling to the branches for a year or more, may still be scattering viable seed many months after they first open in September.

A series of rodent-proof seed catchers were set near a body of green timber near Scappoose, Oreg., in the fall of 1925, and the seed caught in them were collected at fortnightly intervals. It was found that only 65 per cent of the seed fell from the trees before the first of November, and that sound seed fell as late as the following June. In the fall of 1926 another series of catchers were placed near a body of green timber at Wilark, Oreg. In spite of the fact that the seed crop was light and this forest less dense than that in which the previous trial was made, good seed were found to be flying in January.

This study of seed fall was supplemented with an examination of cones periodically collected from certain trees in the same general region. Cones collected January 15 showed eight seeds to the cone, of which 16 per cent were viable; and it was found that as late as April 15 two seeds to the cone remained, of which 14 per cent were sound.

Seed retained in the cone of Douglas fir is well protected from the weather. Under each scale of the cone is a pocket containing two seed. The pocket is covered with a light coat of resin, which when the seed ripen becomes dry and hard. This resinous coat is so smooth and glossy that water runs off it promptly without wetting the seed. Besides, the thin tips of the cone scale during rainy or foggy weather absorb water from the air and thus swell, causing the cones to shut. Practically impervious to moisture in this condition, the cones retain the seed until the air again is dry.

As a result of this seeding habit of the Douglas fir some of its seed spend a part of the winter in a dry pocket that may well be considered a better storehouse than the alternately wet and dry surface of the ground; are kept safe from late summer or early fall slash fires and also from birds and rodents; and are released under a variety of wind directions. These facts indicate the great value of seed trees on Douglas fir lands recently cut over or burned.

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The forest experiment station recently established by the Federal Government in cooperation with Ohio State University at Columbus, Ohio, is to be known as the Central States Forest Experiment Station.

On the Trail of the Vanishing Longhorn

By **Will C. Barnes**, United States Forest Service

When the first Spanish adventurers set foot on this American continent they found neither horses nor cattle. Both are exotics. The nearest approach to cattle was the bison, mistakenly called "buffalo." "Hump-backed cows," the Spanish called them.

The first cattle to set foot on America's shores were swum ashore near Vera Cruz, Mexico, in 1521, from some ships under the command of Gregorio Villalobos, a governor-general sent to rule "New Spain." The written report of Villalobos's voyage says clearly: "He brought a number of calves (oviese ganado) from San Domingo, he being the first to bring them to New Spain."

The Spanish have never been interested in improving their livestock. If they had any ideas on this subject where cattle were concerned it was to produce a leggy, active animal with keen horns, an aggressive disposition, and a nature suitable for their national pastime. Beef production undoubtedly came second.

These Spanish calves were the progenitors of the millions of longhorn cattle that spread rapidly fanwise from Vera Cruz, over the coastal plains of Texas and he Great Plains region of the far West. In forage and climatic conditions these cattle found themselves n a region very like that they left in Spain, and they hrived from the first.

Texas at the close of the Civil War was overflowing with longhorn cattle. With the end of hostilities this overflow surged northward across the plains until rom the Gulf to Canada this hardy breed pressed the uffalo and the Indian back until the whole country was theirs.

They were the pioneers, but like pioneers they had to give way to the demand for improvement. "Too much legs, horns, and speed, and not enough beef," ame to be the general opinion of the range men. The longhorns had had their day. They were driven rom the ranges, not by force but by the simple process of evolution—the survival of the fittest.

Thus within comparatively few years this breed of cattle, so closely tied up to the history, romance, and adventure of the Southwest, was about to become extinct. To some men who had known the longhorns for nearly half a century this seemed almost a tragedy—a national misfortune. For years, however, appeals to Congress for money to buy a few from those still left fell on deaf ears. "Cui bono?" the law makers asked in the old school-boy phrase. "No economic values are involved. They have served their day. Let 'em become extinct. Forget them." "Listen," said the old-time cattlemen to the solons, "Congress spent $25,000 to save the buffalo, that never were anything like as near complete extinction as are the longhorns, and quite as much in 1906 to save the remnant of the old Morgan horses. Massachusetts is spending this year more than $10,000 to save the heath
hen, and the whole country applauds the act." Ev
tually, this year, a small sum was granted for
purchase of a few cows and some bulls, and two v
much pleased forest officers went down into Texas
search of longhorns—and adventure. They fo
both.

At Fort Worth, San Antonio, and other points
general feeling was that their quest would be unsucc
ful. "A few old cows might be found," they w
told, "away down in the 'prickly pear' country of
lower Rio Grande, in the dry resacas or the cottonw
bosques along the river or in the dense mesquite thicl
of the plains." But bulls! Well, that was someth
else again. Everybody doubted the possibility
finding them.

John H. Hatton, from the Denver office of the Fo
Service, and I first plunged into the prickly pear co
try between Laredo and Brownsville on the Rio Gra
and Corpus Christi on the Gulf. We hunted out ev
nook and corner of this region on every imagin
kind of transportation. We had to invent a stand
type by which to make our selections. We tal
longhorns to every human with whom we came
contact. From all this and from our own experie
in the past we built up in our minds a picture of
old-time longhorns from which we developed a stand
or type.

In two weeks we had spotted 10 cows and 1 bu
that corner of Texas as meeting our requirements.
found one here, one there. We hired a cattleman
knew the country to gather them at a central poi
shipping. This was done mostly with auto tr
carrying huge crates. The truck was backed
against a corral, holes were dug into which the
wheels would drop, and the cow coaxed or dragged
the crate or cage and hauled across country to
railroad.

Having exhausted this end of Texas we move
into the great coastal plains section between Ho
and Beaumont. Here was an entirely diff
country—vast open prairies with some "piney wo
and scattering mesquite. Ten thousand acres
single rice field. A hundred and fifty thousand
in one cow pasture. One of the great range c
sections of the State. We were told to go there bec
the longhorn steers for the "North of 36" movie
gathered from these ranges. We combed the r
thoroughly. Ninety per cent of the cattle were car
the blood of the sacred Hindoo or Brahma cattle.
gathered 10 excellent longhorn cows and 2 good
in this section.

Inasmuch as the steers are the ones that develo
extremely long horns, we bought three glorious
mals with good-sized horns to be kept as an ex
of what a longhorn should be. They are all y
and their horns will probably grow at least 18 i
more in the next three or four years. They wi
out the picture until we can raise some ourselves.

The two shipments were concentrated at
Worth and dipped three times at seven-day inte

o free them of the deadly Texas-fever tick. Then, because Oklahoma requires all breeding cattle entering the State to be tested for tuberculosis, they were crowded into a long narrow chute and a veterinarian of the Bureau of Animal Industry injected into the ail of each animal a dose of tuberculosis "medicine." Three days later they all went through the chute again to see if there were any "reactors." There were none. Then the whole bunch were put through a branding chute and branded "U. S." on the left hip.

The horns of the three big steers would not pass hrough the "dip" so the animals had to be roped, ied up to a post, and sprayed just as a gardener sprays his rosebushes. To this operation they objected most trenuously, and we were in an agony lest in their truggles some of those precious horns should be broken. Fortunately no accident occurred.

During the time the animals were in the Fort Worth ards five different movie outfits took shots at them, uring which time the senior forest officer was chased p the fence several times by angry and excited steers hat did their best to help him up with their long keen orns. An unfeeling observer remarked that the proeeding reminded him strongly of an alley cat hustling p a city shade tree just about one jump ahead of a vely fox terrier. The principal actor can recall that, ke some airplanes, he seemed to lack speed and limbing ability. It was a red-hot day and he remembered later the fact that considerable shirt tail fluttered n the breeze as he mounted the fence. Also that he ad a weak heart and his doctor had warned him gainst any violent exercise. He survived, however.

While he was inspecting one steer at a ranch in a mesquite thicket away down near Laredo, another hasty ence-climbing took place, with the long keen horns of a urly old steer playing a regular tattoo on the soles of the man's shoes. There was also a short but very intersting foot race just before the fence was reached that undoubtedly broke the record for a 50-foot sprint. While the man was perched precariously on the top board of the fence with the aforesaid surly steer still on the job, his pet Panama blew off and landed in the center of the corral. With a mad bellow the steer umped for the hat. What he did to it was a plenty. He stamped on it, slobbered over it, pawed at it, and nally managed to impale it on one of those rapierke horns. Then he pranced excitedly around the corral, snorting and bawling and wearing in triumph hat head covering from the Tropics. Eventually the at came off and the steer, apparently highly pleased ith himself, backed off into one corner and watched he taking of his picture without further action on his art.

It was like old times to one of the men to sit in the aboose of a long freight train with a car of cattle head, and crawl out "over the top" of the train in the ark night to make sure his cows were all there. Cache nd the Wichita Forest were eventually reached and he cattle placed in the pasture provided for them. warms of people came out from surrounding cities to look them over and the old-time cowmen of the region all agreed that the bunch we had collected were really fine specimens of the old longhorns—perfect types with which to build up a modest herd of 250 or 300 head and thus preserve the breed for future generations of Americans to admire.

Like the buffalo, the longhorn will not become extinct.

Stockmen Indorse Federal Range Research

At the third biennial field day of the Great Basin Experiment Station at Ephraim, Utah, August 16 and 17, the attending stockmen passed a resolution indorsing the range research program of the Federal Government and favoring continued Federal control of the public domain. About 200 persons attended the meeting and examined the studies under way at the station. Camp-fire discussions were also held on range problems, the place of research in the solution of those problems, and what better range management means in bringing about more stable and profitable livestock production, watershed protection, and community welfare.

At the Uintah Basin Industrial Convention at Fort Duchesne, Utah, August 3 to 5, stockmen "assembled in convention ten thousand strong" passed similar resolutions, with the addition of indorsing Federal regulation of grazing on the public domain. The registered attendance at this meeting was 14,000. Two two-hour periods each day were given to discussions and lectures on range, livestock, field crops, foods and nutrition, home management, and clothing, and exhibits on these subjects were shown.

National Forest Receipts

The income from the national forests during the year ending June 30, 1927, was $5,166,609. These receipts exceed those of any preceding year except 1923 and 1924. Timber sales and settlement brought in $104,815 less than in 1926. Grazing fees totaled $112,562 more than in 1926, largely because for that year grazing fees were remitted in the drought-stricken region of Arizona, New Mexico, and Utah. Turpentine sales brought in practically identical amounts in the two years. Special uses and waterpower receipts showed substantial increases in 1927.

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The number of national forests was diminished by one on June 29, 1927, through the rescinding of the Executive order of April, 1925, that created the Upton National Forest of 6,154 acres on the area of Camp Upton, N. Y. The War Department has classified Camp Upton as surplus property and obtained authority from Congress to sell the area. In view of the real estate values involved the Forest Service did not oppose this action of the War Department.

General Forest News

Providing for Second Cut Increases Present Profits

By W. W. Ashe, United States Forest Service

By some changes in milling plans, but chiefly by ceasing to cut any trees below 15 inches in diameter, the Crossett Lumber Co. of Arkansas has reduced its operation costs by more than $1.50 per 1,000 feet. To a company operating three pine mills with a cut of about 70,000,000 feet a year, this means a very important saving.

The new woods and milling policy of the Crossett Co. is based on the results of an investigation of its operation which I was employed to make, analyzing logging costs, milling costs, the relationship of logging and milling costs to overhead and other similar charges, and the relative profit or loss in handling logs of different sizes. The company is planning for a permanent cut. This analysis of its operation has enabled it to estimate closely the cost to the present operation of leaving any number of trees of any given size as a basis for a second cut, and how far it can go in that direction without impairing present profits.

The statement of John Watzek, jr., vice president of the Crossett Co., that the company's operation costs have been reduced by $1.50 per 1,000 feet is based on a comparison of logging costs during the first month following the adoption of the new plan with those of the preceding six months. This was a net reduction; in figuring it, account was taken of the increase in railroad construction cost, the increase in overhead, and the increase in the cost of fixed charges due to curtailment of cut.

In addition to lowering the cost of logging, the new plan effected material saving in sawing costs. It also brought about an improvement in the grade of the lumber produced and an increase in its average selling value. These savings more than make up for the decrease in the amount of timber cut.

It must be understood that the diameter fixed as giving approximately the maximum profits in this case can by no means be accepted as applying to the conditions of every other operation. To attempt so to apply it would be like taking the prescription given for a case of typhoid fever and applying it in a case of double pneumonia. The conditions that determine the cost factors in different lumbering operations are essentially no more alike than the conditions of these two diseases.

* * *

In May and June of this year more than 800,000 wild and 360 cultivated gooseberry and currant bushes were destroyed in the counties of York, Cumberland, Oxford, Androscoggin, Sogadahoc, Kennebec, and Lincoln in Maine. Through this eradication work 10,000 acres of white pine are protected.

Preventing Termite Damage to Buildings

By Thomas E. Snyder, United States Bureau of Entomology

Forty-two different kinds of termites or "whit ants," practically all native, occur in continent United States. Damage by these insects to the woo work of buildings is especially serious in the Sout east, Gulf, Central West, Southwest, and Pacific Coa States. In the tropical possessions of the Unite States much more serious injury is caused by differe and more destructive termites. As an estimate the damage done by termites each year to timber use for various construction purposes in the States and the tropical possessions, the Bureau of Entomolo believes that $15,000,000 is a conservative figure.

The termites that damage buildings are of two habit subterranean and nonsubterranean. The subterr nean termites require much moisture, which they obta from the earth. They must always maintain conta with the earth, and so attack wood only indirectl The nonsubterranean termites, on the other han require so little moisture that they can live in wo having a moisture content of less than 10 per ce Damage to buildings by subterranean termites occu in every State of the Union; damage by nonsubterr nean termites occurs only in the area south of a sla line drawn between Norfolk, Va., and San Francis Calif.

Termite damage to buildings is due to man's d turbance of the balance of nature. Under primiti forest conditions termites performed a necessa function as scavengers. When the clearing of t forests from large areas deprived them of their natu home and food, it was inevitable that they should diverted to wood that had been taken from the fore and used in building operations.

Contrary to a widespread popular impression, w is by no means the only construction material subj to termite damage. Substitutes for wood are a attacked—fiber boards, plaster boards, mortars, plaster—and so are improperly constructed buildi having foundations of masonry, brick, and concrete

Termite damage to buildings can be prevented most cases through certain methods of constructi The way of prevention lies not in the choice of typ kind of construction material, but in the manne utilizing the material. Wood, masonry, concr brick, hollow tile, stucco, and even rammed earth all be used in such ways as to ward off effectively attacks of the insects. Prevention is much sim and cheaper than any remedial measures, because a termites are once established in a building they be very difficult to eradicate. A few hundred dol added to the initial construction cost of a building save thousands of dollars in later repairs and repl ments made necessary by termite damage.

The Bureau of Entomology is recommending that a few simple measures for excluding the insects be incorporated in city building codes, and is suggesting these measures to home builders and owners in rural communities through the county agricultural agents. The recommended measures are: (1) Insulation from the ground of all untreated material, either by the use of tone or concrete foundations and of the most impenetrable grades of mortar and plaster or by the use of timbers impregnated with coal-tar creosote; and (2) the use of termite guards or shields of sheet copper over foundations of any type to prevent the subterranean termites from extending their earthlike helter tubes over the surface of the foundations to ntreated material above. These copper shields are nserted over the foundations with the projecting edges urned down at an angle of 45°. They need not be nsightly, and may even be made decorative.

An additional point in favor of these construction methods is that they prevent the entrance of many nnoying and injurious household rodent and insect pests.

In close cooperation with the Forest Products Laboratory at Madison, Wis., the Bureau of Entomology is experimenting with various wood preservatives to determine which are most effective in preventing termite attack. The tests are being carried on oth in this country and in the Canal Zone, Panama. On Barro Colorado Island, Canal Zone, on which 30 species of destructive termites occur, the bureau is conducting experiments in cooperation with the American Wood Preservers' Association. Here woods impregnated with different preservatives have been uried in a plot, or "graveyard," and in August, 1926, model termite-proof building was erected. All the wood for this building was impregnated with such standard preservatives as coal-tar creosote and zinc chloride. Both the full and empty cell pressure processes of impregnation were used, the treatment varying according to the position the lumber was to have in the structure. At the same time several buildings of heartwood redwood from the Pacific coast were erected on the island for the purpose of testing thoroughly the resistance of untreated redwood to the attacks of both subterranean and nonsubterranean termites.

Tests of mortars and concretes of various different combinations are being conducted by the Bureau of Entomology to determine what composition for foundations below the surface of the ground is most effective in preventing penetration by termites. At Falls Church, Va., 16 test walls or panels were completed in August, 1926. Similar test walls have been built at Urbana, Ill., by the State entomologist in cooperation with the Bureau of Entomology.

Heretofore, adoption of the practices recommended for the prevention of termite damage has been limited by the nonavailability of adequate supplies of treated lumber. Through a recent action of the National Committee on Wood Utilization, a continuous supply of lumber chemically preserved in accordance with the standards of the American Wood Preservers' Association, both as to methods and as to materials, is to be made available in the territory included within a circle of 50-mile radius centering in St. Louis. The merchandizing program adopted by the committee, which will be put into operation immediately, will be adequately supported by advertising and publicity. Plans are on foot for gradually increasing the radius of the territory served and for arranging similar operations elsewhere until treated lumber becomes available to the small consumer in all parts of the country.

Spark Screens of Pines for Rights of Way

The Pennsylvania Railroad this spring planted 11,500 pine seedlings along four stretches of main-line tracks in the Logan forest district, Pennsylvania, where fire hazard is high. The trees were placed at intervals of only 3 feet, and it is expected that within a few years their interlacing branches will form a screen that a live spark can scarcely penetrate. The seedlings, of Scotch pine, pitch pine, and Norway spruce, were supplied by the Pennsylvania Department of Forests and Waters, and the planting was done under State forestry supervision. Two of the plantings are on State forest land at the Spruce Creek Tunnel and two on private land south of Birmingham station.

Wood Pulp for Dentists' Dams

Invasion of a field until recently held by the cotton linters is seen in the use of wood pulp for making the little cylindrical rolls or "dams" which dentists place in the mouths of patients. The new dams apparently are made of very soft paper rolled to the desired form. Some are slit lengthwise for adaptation to clips which hold them in place. They show widely varying degrees of density and absorptive power.

A Washington, D. C., dentist states that these rolls are preferable to the cotton dams, because the relative shortness of the wood fiber permits their being broken at any desired point so as to fit into the place where the work is being done. The short fiber also gives a smoother surface. The old style dams were covered with fuzz which frequently became entangled in the revolving drills, with the result that the dam was pulled out of place. With the wood pulp roll this does not happen.

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A 60-year-old second-growth redwood forest at Powder Mill Flat, in Santa Cruz County, Calif., according to observations carried on for the past 10 years by the University of California, is growing at a rate of nearly 2,000 board feet per acre per year. The trees average about 30 inches in diameter and 140 feet in height.

Gum Yields on Burned and Unburned Land

By Harry Lee Baker, United States Forest Service

N. G. T. Simerly, manager of the woodlands belonging to the Tennessee Coal & Iron Co., Stapleton, Ala., gives the following instance in support of his theory that gum production is lowered if fires are prevalent. A neighbor, who had been successful in keeping fire off his property for a number of years, leased his turpentine trees with the understanding that light burning was not to be practiced during the turpentining operations. The operator was successful in keeping fire out, and at one dipping obtained 2½ barrels of gum from 1,300 cups. At the same time, on an adjoining area that had been burned over repeatedly and that was burned in advance of turpentining, this operator obtained 2 barrels of gum from 2,000 cups. On the basis of 1,300 cups it appears that the yield on the burned ground for one dipping would have been about 1.3 barrels, or approximately one-half as much gum as the same number of trees produced on the unburned area. In another case cited by Mr. Simerly, the operator estimated that yields in gum were 25 to 33 per cent greater where fire had been kept out.

This information is based upon casual observations, not upon careful investigations of all factors influencing yields. There might have been some difference in methods, site quality, age, spacing of the trees, etc., but Mr. Simerly is of the opinion that conditions were sufficiently similar to prove that light burning prevents maximum yields in gum.

Mr. Simerly does not favor burning on his company's property except to create firebreaks throughout the property or protective strips along roads. In 1926, when 16,000 acres of the land under his charge was given organized protection, only 2½ per cent of this area was burned over; and during the first half of 1927 only 0.6 per cent of the protected area was burned.

* * *

This year's annual meeting of the Allegheny section of the Society of American Foresters, held in the last week of July, consisted in a three-day tour through the anthracite section of Pennsylvania. Industrial operations including industrial wood utilization and industrial forestry were seen under the guidance of A. C. Silvius, forester of the Philadelphia and Reading Coal & Iron Co.; A. C. Neumiller, forester for the Lehigh Coal & Navigation Co.; and W. W. Scranton and G. R. Taylor, president and forester, respectively, of the Scranton Gas & Water Co. A party of 41 members and 34 guests made up the largest attendance the section's summer meeting has ever had.

* * *

The Pine Institute of America has moved its headquarters to Jacksonville, Fla., where it now has offices in the Barnett Bank Building.

National Research Program Indorsed

A resolution adopted by the Legislature of Wisconsi urges that Congress pass the bill introduced by Representative McSweeney proposing an adequate national program of forest research. The legislatur advocates passage of this bill on the basis that "th future prosperity of Wisconsin is bound up in mai taining and restoring the productivity of forest land and the effective utilization of their forest products a well as the related recreational, game and fish, an other resources.

"* * * The efficient development and use of fo ests and the products therefrom is dependent upon permanent enlarged program of forest research * * not only for Wisconsin but also for the entire Unite States."

Another voice raised in advocacy of the McSweene bill is that of the National Lumber Manufacturer Association. At its annual convention in April, in Ch cago, the association adopted a forestry resolution i dorsing the bill as a means toward "bringing abo sound conditions for perpetuating our forest resourc and our forest industry."

A Champion Tree Planter

A. J. Hummel, a lumberman of Millville, Columb County, Pa., some 30 years ago planted a few walnu along a fence on his father's farm. The farm w sold soon afterward, but Mr. Hummel continued watch the growth of the walnut trees and was mo and more impressed with their rapidly increasing val as contrasted with the general unproductiveness of t farm. In 1916 he began tree planting in earnest, w 5,000 Scotch pine and larch from the State nurseri These trees grew much better than he had expect and encouraged him to plant on a larger scale. So as the records of the State forestry organization sh he now holds first place among Pennsylvania's in vidual forest planters. He has planted 439,000 tr obtained from the State, 10,000 seedlings obtai from commercial nurseries, 300 bushels of walnu and 40 bushels of red oak acorns.

For the last few years Mr. Hummel's tree plant has cost less than $6 an acre. His method of prepar the ground is to plow furrows about 4 or 5 inc deep. This takes less time than digging holes w mattocks, and largely does away with the competit of weeds and grasses for at least two years.

* * *

Forest products made up approximately 12 per c of the total purchases of fuel, materials, and supp made by the railroads of the United States in 1 according to a bulletin of the committee on pu relations of the eastern railroads. During the the railroads spent $186,291,234 on forest produ including 93,759,913 cross ties.

Hard-Hearted Trees

In several recent instances foresters in the West ave been greatly mystified by the discovery of a chunk f rocklike substance in the heart of a burning tree. n one case a dead tree near Priest Lake on the Kaniksu Vational Forest, in northern Idaho, had been set on re by lightning. When the burning tree was disovered by a forest ranger the top had already been onsumed, leaving only a 30-foot stub. The ranger ut out the fire in the top of the stub with water arried up a ladder, and was digging around in the harred and hollow top to make sure it was extinguished hen his shovel struck the rocklike mass. Various heories were advanced as to the nature of the subtance, the one most popular with local residents being hat it was a meteor that had set fire to the tree. hemical analysis in the laboratory of the University f Illinois, however, showed that the material was 30 er cent potassium oxide, 22 per cent calcium oxide, nd about 20 per cent or more calcium carbonate. ppreciable quantities of permanganate, phosphorus, agnesium, and sodium were found, with smaller mounts of other materials. The mass weighs about 0 pounds. Foresters believe that it is a clinker formed somewhat the same manner as those that appear in furnace under certain forms of draft and with certain inds of coal. The tree in which this clinker was und was rotten at the center. Apparently the heat ncentrated the mineral elements in the wood just elow the smoldering flame, where when suddenly oled with the water they formed the clinker.

Two other very similar instances were reported at out the same time; one from the Coeur d'Alene ational Forest in Idaho and one in the Cascades of ashington. The first instance was in western cedar d the latter two were in western hemlock. Similar ses have been reported in times past from various rtions of the West but have not been fully analyzed.

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The First National Bank of Henderson, Tex., disibutes forestry publications and forest fire warnings farmers and regularly includes forest fire warnings d forestry slogans in its advertisements in county pers.

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A 17-acre woodlot on a farm near Hollis, N. H., was t over in 1894. The owner, Mr. Hill, paid the choprs a bonus of $20 to leave the small growth. Mr. ill's son has since cut 50,000 board feet of pine from e lot, and two years ago refused an offer of $2,000 r all trees over 8 inches in diameter. For lumber wed at a near-by mill and delivered at Nashua the der Hill collected $11 and $9 per thousand. During e winter of 1925 logs piled at the roadside on the lot re sold by the son for $18 per thousand.

Lumber Companies Making Cooperative Study of Brush Disposal

Six lumber companies of north Idaho are cooperating this year with the research department of the Western Forestry and Conservation Association in trying out different methods of disposing of the slash fire hazard in the mixed woods type. The syndicate includes the McGoldrick, Winton, Panhandle, Blackwell, Rutledge, and Potlatch companies. The experiments are expected to require at least two years. The director is Norman C. Jacobson, who is conducting similar work for the Boise-Payette Lumber Co. in south Idaho and for the Brooks-Scanlon and Shevlin-Hixon companies in eastern Oregon.

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The Tennessee Coal, Iron & Railroad Co., of Birmingham, Ala., is growing timber for its own use on 50,000 acres of cut-over land in Baldwin County, in the southern part of the State. The land was cut over about 40 or 45 years ago and again from 17 to 20 years ago. Much of it has an unusually full stand of longleaf pine, and some slash pine saplings and poles up to 30 years of age. Through the cooperation of the people of the vicinity and through an intensive system of firebreaks that has been established on a portion of the land, the company has succeeded notably in preventing fires.

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Redwood blocks are being used in southern California as flooring material for factories and other buildings in which floors receive hard use, the California Lumber Merchant reports. Nine hundred thousand feet of redwood lumber have gone into the floors of the Sears, Roebuck & Co. building in Los Angeles, in the form of blocks 2 inches thick, 4 inches wide, and 6 inches long. In the Wilshire Country Club, Los Angeles, floors of redwood blocks are giving excellent service, the Merchant says, showing no damage whatsoever from golf shoe spikes and "getting better every day with use."

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Charles F. Emerson, a furniture dealer of Milford, N. H., began gathering and planting white pine seed in 1907 and 1908. He has now set out on his farm more than 25,000 trees, practically all of which he raised from seed of his own collecting.

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Nine high-school boys of Walton, N. Y., this spring planted on their home farms 8,700 forest tree seedlings ordered for them from the State conservation department by Representative John D. Clarke.

Foreign Notes

New Figures from Switzerland on Forests and Run-off

(From an article by H. BURGER, Swiss Forestry Journal, March, 1927)

In two small watersheds in the Canton of Berne, Switzerland, measurements have been taken which indicate very definitely the effect of the forest cover on run-off. These two watersheds are similar in altitude, exposure, slope, and character of soil. They are 3 kilometers distant from each other. One (the Sperbelgraben) is entirely wooded, the other (the Rappengraben) is only 35 per cent wooded. The entirely wooded basin has an area of 56 hectares, the other 70 hectares.

On June 22, 1926, at 5 p. m., a violent storm took place, during the course of which 28 millimeters of rain fell on the wooded basin and 29 millimeters on the other. The maximum flow from the partly forested basin was 1,079 liters a second for each 100 hectares and the crest occurred half an hour after the beginning of the rain. The maximum flow from the completely forested basin was only 240 liters a second and the crest occurred about five hours after the storm began.

The total run-off per square kilometer during the period from the beginning of the storm until June 23 at 6 a. m. was 7,696 cubic meters on the partly forested basin and only 4,720 cubic meters on the completely forested basin. By subtracting the amount of normal flow, observed just before the storm in each case, the run-off due entirely to the storm is obtained. This is 6,184 cubic meters for the partly forested basin and 2,970 for the completely forested basin. On the partly forested basin 21 per cent of the storm water ran off; on the completely forested area only 10 per cent.

Is the Sahara Drying Up?

"In the whole of North Africa the forests are retrogressing," according to Inspector Lavauden of the French Forest Service. In substantiation of this statement he cites, in an article in the Revue des Eaux et Forêts, examples of the disappearance of forest growth, the drying up of waters, and the steady encroachment of desert conditions. At Kaufra forests and pastures covering 17,000 square kilometers disappeared in less than 50 years. Forests that surrounded Laribus near Kef in Tunisia, other forests in the center and south of Tunisia, the forests at Cap Cantin and those in Tripoli near Lebda, Colline des Graces, and Cap Misrata, mentioned in the writings of ancient historians, have entirely disappeared. On the southern edge of the Sahara, a country formerly of fertile fields west of Timbuktu was found in 1914 to be one of the most desertlike regions in Mauritanie. Streams and marshes of former days have disappeared and th water table has lowered.

Inspector Lavauden comes to the conclusion th the future of the whole region is menaced by a stea drying out that has been going on for a long time a in recent years has speeded up. The causes of th drying he believes are threefold. Man is responsib for a good deal of it because of the abuse and destru tion of forests. The lay of the land has a powerf influence. The Sahara plateau has a slope toward t Atlantic, which is gradually turning the courses rivers from north to south. He cites the case of t Niger, which formerly reached the region of Taoude more than 600 kilometers from Timbuktu, but whi has now made a turn to the south to flow more direct to the Atlantic. At the present time the Logo River is in process of changing from a tributary of t Chari to a tributary of the Benoué. When this accomplished the flow of the Chari will be cut in h and the drying out of the region will be greatly acc erated. The most important influence, however, the destruction of the equilibrium between precipi tion and evaporation. This is due, Inspector Lavaud believes, to the diminution of precipitation.

The last and most important influence, insufficie precipitation, is beyond the control of man; but son thing can be done about the other two. And Inspec Lavauden suggests a number of what he calls locali remedies. In the north reafforestation wherever p sible, defense measures against desert encroachment certain mountain zones, and regulation of grazing the means suggested. In the south the primitive c ditions under which the natives live make such me ures impossible. There, and in the central Saha he recommends the building of dams at strate points to retain the water from the infrequent stor These would permit the forming of watering places facilitate communication across the desert. Some them would suffice even for irrigation and power. T amelioration of conditions in the south and cen Sahara is of importance in the protection of the rem ing forests of the north; for the drying up process in south has already resulted in the exodus of noma tribes to the north and these tribes are someti accommodated in the north at the expense of the fore

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Yugoslavia, with 7,374,973 hectares of forests, 62 hectares to every 100 inhabitants. The nor annual cut is about 15,000,000 cubic meters, whic 1,000,000 cubic meters more than the estimated an growth. About 1,000,000 cubic meters a year is sumed as fuel. Of the forest products exported, wh amount to more than 1,500,000 tons a year, abou per cent goes to Italy.

Summer Forestry Course for Australian Boys

In an effort to teach the public to value the nation's orests, the Education Department of South Australia ach summer sends 250 boys into the Forest of Kuitpo o study elementary forestry. The boys come from he high schools in all parts of the State and from St. Peter's College and the training college for teachers. Twenty-five boys are admitted at a time. The course asts 10 days, and is given ten times each season. The oys pay £1 apiece, and receive free transportation.

The course of study was planned by Prof. H. H. Corbin, now of Auckland University College. The boys tudy the characteristics and uses of the different forest ree species, and get a taste of such subjects as the rinciples of nursery practice, forest planting, forest rotection, and forest influences. Two hours of each fternoon are given to the use of surveying instruments, stimating heights and volumes of trees, and pruning. dvanced work is provided for students who attend he school a second time. One morning is spent in sawmill.

Ground for a cricket pitch and a tennis court was eared by the boys attending the first school, in 1921, nd has been improved by succeeding classes. Another ttraction of the camp is the neighboring swimming ole.

wedish Experiment in Preventing Rot and Fungi in Stored Logs

Experiments carried out in central Sweden by the wedish Institute of Experimental Forestry with arious ways of storing logs that are to lie in the woods r a year or so showed that it is impracticable to dry e logs to such a degree that rot fungi will not develop. his left the alternative of keeping the logs too wet r the development of the fungi. The institute recomends that the bark be left on logs that have not been arred, since it protects them against both blue sap ain and rot fungi. The unbarked logs should be led directly on the ground, parallel and preferably in e shade, and should be covered with duff and litter. ock salt strewn in the pile gives further protection to gs on which the bark has been injured. Logs that ave been badly barked should be piled in the same ay, but covered with spruce limbs instead of duff and ter.

In regard to the storage of pulpwood the institute ached the opposite conclusions. Because of their nall mass pulpwood billets are easily dried to the egree necessary to keep fungi out, and there is no anger of their depreciating from drying checks. herefore the institute recommends that pulpwood eing left to lie in the woods for a year be barked cometely. It points out also that short lengths are able dry out faster than long ones and that pulpwood is ss liable to storage rot when "straw-piled" or crossled than when piled in "cordwood" form.

Forest Products Research in India

The forest products laboratory of the Forest Research Institute at Dehra Dun, India, established in 1906, now employs a staff varying from 250 to 300 men and is operated at an annual expense of more than £30,000. The laboratory has made a variety of contributions to the country's industrial practice. The section of timber testing has provided the departments of public works and military works with grading rules and working stresses and has carried out extensive work with wood for railroad ties in behalf of the Indian Railways. Valuable data on air seasoning have been collected through experiments in nearly all the provinces of India, and kiln seasoning has been demonstrated with the result that this method has been adopted by a number of factories. Railway companies have been interested in the preservative treatment of wood. Through the activities of the laboratory's paper pulp section a new industry has been started in India—the manufacture of pulp and paper from bamboo. Bamboo is now used almost exclusively as raw material for a large pulp and paper plant in Calcutta. The section of minor forest products has put the Palamrosa or Rosha oil industry on an entirely new footing by the introduction of up-to-date methods of distillation. The section of wood technology has prepared macro and microphotographic slides of most of the important timbers of British India, and has well under way a treatise on the structure, seasoning, working qualities, and uses of some 350 timber species.

In addition to the central laboratory, there are in India five provincial organizations for research in wood utilization.

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The town of Hanover, in western Ontario, this spring set out 35,000 pines on municipal land around Ruhl Lake, the source of the town water supply. St. Marys, in the same part of the Province, planted 17,000 trees on a 16-acre plot of rocky land. The township of Mono, in Dufferin County, started a municipal forest on 50 acres of land that came into the township's possession in a tax sale. The provincial department of lands and forests supplied 13,000 trees free of charge and also looked after the planting.

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The receipts from French Government forests for 1926 for timber and turpentine amounted to 347,956,966 francs. This does not include special uses of any kind, such as hunting permits and concessions on the forests.

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Polish shipments of sawn softwoods to England in the first five months of this year were more than twice as great as those of any other country, totaling 333,675 loads. The next largest total shipments were sent in by Latvia and Sweden.

A Radio Fire Warning

At La Ciotat, Bouches-du-Rhône, France, a new method of fire warnings by use of the radio has recently been demonstrated, according to Bois et Résineux (June 26, 1927). Radio waves sent out from a lookout tower on the Pic de Bretagne released an alarm bell at La Ciotat and the information about location of the fire, etc., was then given by radio in the regular way.

One of those present at the demonstration expressed the opinion that "thanks to this apparatus, the protection of the forests has made an immense forward step * * *. Proprietors themselves will receive the alarm in the depths of the forest and the guards and turpentine workers, and the operators, who are the victims of the scourge, will be able to fight the fire when it starts instead of being, as now, often the last to know about its existence because of the density of the stand and underbrush, the topography, the direction of the wind, or the fewness of the inhabitants."

The apparatus for sounding the alarm by means of radio waves has been patented by M. Duzéa, a professor at the Electrical School of Saint-Barnabé.

New Zealand Woods to be Tested for Pa Making

The New Zealand Forest Service has sent Ale Entrican, engineer in forest products, to the Ur States with two carloads of woods grown in Zealand which are to be tested at the United St Forest Products Laboratory for paper-making quali Six species, both native and introduced, are t tested. The purpose is to find uses for thinnings the extensive forest plantations that have been n necessary by the slow rate of growth of the Zealand native woods.

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The forest school of Zurich in Switzerland, fou in 1855, has just come into possession of a school f The new school forest is in the commune of Albisri in the immediate vicinity of Zurich, and has an ar 170 hectares.

Personals

The first State board of forestry of Florida includes H. J. Wicker, Coleman; A. A. Payne, Panama City; E. E. Tharpe, De Funiak Springs; S. Bryan Jennings, Jacksonville; and Simon Williams, Jacksonville.

The recently appointed State forestry commission of South Carolina includes H. L. Tilghman, Sellers, chairman; B. S. Meeks, Florence, acting secretary; Paul Moore, Spartanburg; W. H. Andrews, Andrews; and E. W. Sikes, Clemson. The new forestry law of the State requires that the commission be made up of two practical lumbermen, one farmer who is a landowner, one representative of the public at large, and the president of Clemson Agricultural College.

Those who will serve, with Gov. Robert P. Robinson, as the Delaware Forestry Commission are Dr. G. Layton Grier, Milford; J. C. Darby, Frederica; Williard Springer, jr., Wilmington; and George W. Butz, jr., Wilmington. The commission includes two technically trained foresters, Mr. Springer and Mr. Butz being graduates of the Yale Forest School and the Biltmore Forest School, respectively.

Fred G. Stevenot, of Calaveras County, Calif., has accepted appointment as director of the newly created California Department of Natural Resources.

Benjamin K. Ayers has been appointed to membership on the New Hampshire Forestry Commission, filling the vacancy caused by the expiration of Admiral Murdock's term. Mr. Ayers is a lumber operator and consulting forester of Concord.

D. E. Lauderburn has accepted the position of e sion forester for Mississippi. Mr. Lauderburn has wide experience as a consulting forester both in United States and in Canada. H. G. Mitchell, w he will succeed in Mississippi, plans to enter the S of Forestry and Conservation of the Universit Michigan this fall as a candidate for the ma degree.

R. R. Fenska, professor of forest engineering o New York State College of Forestry, has accepte position of forester for the Massachusetts For Association for his year of sabbatical leave, begi September, 1927.

The Vermont Commission on Conservation Development appointed in accordance with an a the legislature at its 1927 session are Wallace H. G chairman; Mrs. G. C. Robinson; Horton D. Wa Linus Leavens, fish and game commissioner; Robert M. Ross, commissioner of forestry.

J. D. Rue leaves the Forest Products Labor about September 15 to take the position of direct research for the Champion Fibre Co. of Canton, Dr. Rue has been in charge of the laboratory's and paper section since 1921.

J. L. Alexander is leaving the research depart of the British Columbia Forest Service to joi faculty of the College of Forestry, Universit Washington. He will have charge of the wor silviculture and dendrology, and will continu research along silvicultural lines.

R. G. Wheaton has resigned his position as district orester of North Carolina to join the staff of the ortheastern Forest Experiment Station as assistant ilviculturist.

C. L. Stevens, who has completed his residence work r the degree of doctor of philosophy at Yale Univerty, had charge of this summer's camp of the Forestry epartment of the University of New Hampshire and returning this fall to his old position as assistant rofessor of the department.

Irvin W. Gleason, of Williamsport, Pa., has been ppointed chief of the bureau of lands of the Pennylvania Department of Forests and Waters. Jacob . Hoffman, of Johnstown, has been appointed chief f the department's bureau of parks.

David A. Kribs, for the past two years instructor in ood utilization at the University of Minnesota, has esigned to accept a fellowship at the Yale Forest chool. He will work under Prof. Samuel J. Record n the classification of South American woods.

W. K. Beichler has resigned as technical assistant n the Pisgah National Forest to become district rester in charge of the first forest district of North arolina, with headquarters at Asheville.

William Kynoch has resigned as superintendent of e forest products laboratories of McGill University, ontreal, to take a position in the School of Forestry d Conservation of the University of Michigan.

Frank B. Myers, assistant supervisor of the Umalla National Forest, has resigned to become an structor in the New York State College of Forestry.

Thornton G. Taylor has resigned as assistant supersor of the Wasatch National Forest to accept a sition on the faculty of the School of Forestry, niversity of Idaho.

Herbert S. Grenoble, associate engineer in forest oducts, Forest Products Laboratory, has resigned accept a position as assistant professor in the exnsion division, University of Wisconsin.

Henry H. Tryon is leaving South Carolina, where has served as extension forester for the past three ars, to become forester for a large private estate on e Hudson River. He will be in charge not only of restry work but of sawmills and of developments r the protection of wild life.

Ralph K. Day has joined the staff of the Central ates Forest Experiment Station as assistant silvilturist, by transfer from the Coeur d'Alene National rest.

Lawrence W. Rathbun, of the 1927 class of the Yale rest School, has been appointed field assistant at e school for the coming year. He will be associated imarily with the work of silvics, and during the spring rm will take part in the field instruction in the South.

Clifford H. Foster has been selected as superintendent of the Charles Lathrop Pack Demonstration Forest of the New York State College of Forestry, near Lake George, N. Y. Mr. Foster holds the degree of master of forestry from both the New York State College of Forestry and Harvard University. He has had charge of forestry operations on 12,000 acres of commercially operated timberlands near Winchendon, Mass., belonging to the E. Murdock Co.

S. H. Marsh, for the past 15 years supervisor of the Shenandoah National Forest, will report in Washington, D. C., about October 1 to take charge of State and private cooperation in the Eastern National Forest District as assistant district forester. Under a reorganization of the district office this work is being separated from national forest public relations work, responsibility for which will be retained by Assistant District Forester James E. Scott. Mr. March will be succeeded by R. W. Shields, supervisor of the Nantahala National Forest, whose present post will be taken over by Assistant Supervisor Arthur A. Wood of the Shenandoah.

I. T. Haig, assistant silviculturist of the Northern Rocky Mountain Forest Experiment Station, is taking a year's leave of absence for study in the Yale Forest School.

The membership of the Advisory Council of the National Arboretum has been announced by Secretary Jardine as follows: Frederic A. Delano, Washington, D. C., chairman; L. H. Bailey, Ithaca, N. Y.; Henry S. Graves, New Haven, Conn.; Harlan P. Kelsey, Salem, Mass.; John C. Merriam, Washington, D. C.; Mrs. Frank B. Noyes, Washington, D. C.; Frederick Law Olmsted, Brookline, Mass.; Mrs. Harold I. Pratt, Glen Cove, L. I.; and Robert Pyle, West Grove, Pa.

Henry C. Cowles, of the Department of Botany, University of Chicago, and O. L. E. Weber, of the Watab Paper Co., Sartell, Minn., have been appointed members of the Lake States Forest Research Advisory Council for the next two years. They succeed E. E. Parsonage, Minneapolis, and A. T. Roberts, Marquette, Mich.

C. D. Howe, dean of the faculty of forestry of the University of Toronto, has been appointed chairman of the Ontario Forestry Board, recently created by the provincial legislature to carry on forest research.

Conrad H. Hammar, a graduate of the University of Minnesota with graduate training in agricultural economics, has joined the forest taxation inquiry staff of the United States Forest Service.

The Brown Co., Berlin, N. H., has sent four members of its staff to study forest conditions in Germany, Czechoslovakia, and Sweden. The party includes Gordon Brown, S. S. Lockyer, H. I. Baldwin, and V. A. Beede.

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The Problem of the Jackson Hole Elk

By Will C. Barnes, United States Forest Service

In February, 1927, Secretary of War Davis, chairman of the President's Committee on Outdoor Recreation, designated a commission to consider the future management of the Jackson Hole Elk. The members of the commission, which convened in Washington in March, are Charles Sheldon, Boone and Crockett Club, chairman; W. C. Deloney, representing the Governor of Wyoming, Jackson, Wyo.; Robert E. Miller, cattleman and banker, Jackson, Wyo.; Irving H. Larom, dude rancher, Valley, Wyo.; E. A. Goldman, United States Biological Survey; Will C. Barnes, United States Forest Service; Horace M. Albright, superintendent of Yellowstone Park; F. S. Herbert, United States General Land Office; Seth E. Gordon, executive secretary of the Izaak Walton League; O. H. Van Norden, Campfire Club, New York; Kermit Roosevelt, American Game Protective Association; T. S. Palmer, American Society of Mammalogists; Arthur Ringland, National Conference on Outdoor Recreation. The results of their deliberations have recently been given to the public in a very interesting pamphlet entitled "The Conservation of the Elk of Jackson Hole, Wyoming."

Almost coincidently with the meeting a count of the elk, made jointly by representatives of the Forest Service, the Bureau of Biological Survey, and the State of Wyoming, was furnished. In order that the reader may understand the serious situation which the herd constantly faces, this count and the four previous counts made by competent Government officers are submitted:

1912	13, 528
1916	19, 763
1921	9, 346
1925	19, 493
1927	19, 238

There is but reason for the changes in the figures from year to year, according to the report of the commission, and that is plain starvation. The commission finds that although there is an open season within which the State law allows both sexes to be killed, only about 1,000 animals are taken annually by hunters, who may kill but one elk each. Losses by predatory animals and tusk hunters are not heavy and have been reduced probably to a minimum.

On the basis of the counts and the history of the herd the commission believes a normal maximum of 20,000 can be taken care of year after year with the present hay production on Government-owned hay lands, supplemented by purchases of hay from local farmers. The commission does not approve the purchase of additional hay lands because it would tak away just that much taxable property from the Stat It recommends that except to fill out certain comparatively small gaps in the hay lands now owned by th Government no new areas of public domain be adde to the present refuges in Jackson Hole.

The report states that at the present time 2,76 acres of Government-owned land, a considerable par of it hay land, has been set aside by executive procla mation as a refuge and winter hay-feeding station fo the elk. In addition to this, in 1925 the Izaak Walto League purchased and donated to the Governmen 1,760 acres of hay-producing land, making a tot acreage of over 4,500.

"The forage capacity of the summer ranges for th elk and the factors affecting the life of the herd durin their occupancy are favorable and constant," says th report. "The summer ranges are capable of turnin off a relatively unlimited number of elk. The lac of winter range is the crux of the situation." Th report states that for an unusually hard season pounds of hay per animal per day is required, or total of 4,000 tons. Full feeding is not necessary ea winter, and thus the hay produced on the publ farms sometimes accumulates from year to year. 1926 not a pound of hay was fed and the losses we almost negligible. It is the occasional severe wint that causes all the damage. Additional winter rang under Government control the commission finds a not available.

The commission recommended (1) the defin allocation of duties, authority, and responsibility regard to the herd among the Forest Service, t Bureau of Biological Survey, and the Wyoming ga authorities; (2) the pooling of effort and resources these three agencies; (3) the creation of an advis board composed of representatives of several i mediately interested bodies, State and Federal; (4) fixing of the maximum size of the herd, provisiona at least, at 20,000 head; (5) a cooperative and sim taneous winter count of the Jackson Hole herd those other herds of the region which it is belie intermingle with it more or less on the summer ran although widely separated in winter; (6) a close continuous study of all these herds by biologists order that many peculiar and now somewhat obsc facts connected with the life history of the elk may better understood; (7) the establishment of the pres commission as a permanent body; and (8) m flexible State laws, so that changes in season, limits, and kill of sexes may be made quickly if situation calls for such action.

Timber Growing and Logging Practice in the Central Hardwood Region

Timber Growing and Logging Practice in the Douglas Fir Region

Two more of the series of reports on the requireents for keeping forest land productive and for roducing full timber crops have been issued as epartment of Agriculture Bulletins 1491 and 1493 ith the titles above.

In the central hardwood region it is pointed out that ne woodland owner who wishes to grow timber must iscontinue pasturing the woods and must prevent orest fires. If these two requirements are met and a w seed trees are left, a fairly good young growth of mber can be obtained; for there is a marked tendency r the forest to reproduce itself vigorously in this gion if given a chance. Methods of cutting for the roduction of full timber crops where there is already reasonable degree of control over fire and pasturing e suggested in some detail.

The central hardwood region differs greatly from her forest regions of the United States in that three-urths of its timber-producing acreage is in the form farm woodlands, generally from 10 to 40 acres in tent. A large proportion of these farm woods could vastly improved by reasonable care. Because of od soil and favorable climate the region is highly oductive of hardwood timber of fine quality. For l the timber that can be grown in the region a good arket exists near at hand. The district contains the ost important centers of the furniture, veneer, tomobile, and farm-machinery industries of this untry and has numerous other hardwood industries ch as the manufacture of wood handles and flooring, d its farms require large quantities of posts, poles, d cordwood.

In the Douglas fir region the control of fire is the ramount consideration. The principal measures quired to produce continuous timber crops on the nd are preventing fires during logging, making prosion for a natural seed supply, and "fireproofing" e cut-over lands against uncontrolled fires while the w crop is becoming established. These measures e estimated to cost on the average 22 cents for each 000 feet logged, over and above the present customary gging charges. If these protective measures are lopted very favorable yields may be expected in this ghly productive forest region, where sawmills already e working in timber as young as 40 or 50 years. he "excellent" land will produce more than 1,000 ard feet per acre per year, the "good" land about 0, and the "fair" land about 600.

Copies of the two bulletins may be obtained without arge by writing to the United States Forest Service, ashington, D. C.

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Revue des Eaux et Forêts, April, 1927.—Les reboisements en pays Basque Espanol, by H. de Coincy and G. Roux, pp. 167–177.

Timber Trades Journal, May 11, 1927.—Poland's developing timber trade, by W. B. Calder, pp. 30–35.

U. S. Department of Agriculture Monthly Weather Review, March, 1927.—Weather and forest inflammability in the southern Appalachians, by E. F. McCarthy, pp. 119–122.

U. S. Department of Agriculture Journal of Agric tural Research, April 1, 1927.—The natural replac ment of blight-killed chestnut in the hardwood f ests of the Northeast, by C. F. Korstian and P. Stickel, pp. 631–648. May 1, 1927.—Run-off fr small agricultural areas, by C. E. Ramser, pp. 79 823.

Proceedings of the Ninth Southern Forest Congress

The holding of the southern forestry congress Jacksonville this year was an omen. In less than th months afterwards Florida had a forestry law. H ever, although Florida gets a large share of attent in the addresses printed in the proceedings, the sta of forestry in nine other Southern States is given c siderable space, questions of national, State, and l interest in the country as a whole receive attenti European forestry is discussed by Roy L. Hogue Mississippi, and the story of the grasslands is told Will C. Barnes of the United States Forest Serv The volume includes the full text of all but one of addresses made at the meeting, which was reporte the May number of the Forest Worker.

Recent Publications of the Forest Serv

Map Folders: Ouachita National Forest of Arkan Fremont National Forest of Oregon; Medicine National Forest of Wyoming; Bryce Canyon tional Monument (Utah); Flathead National Fo of Montana; St. Joe National Forest of Idaho.

American Woods Leaflet: Beech.

Forest Products Research in Pictures, No. 76: Tr ing-Plant Plank Preaches Sermon on Wood Rot.

National Forest Administrative Maps: One-fourth i Tusayan, Nezperce, and Uinta; one-half inch, perce, Holy Cross, Lemhi, and Salmon.

◆

An outline of "good naval stores practice" pared by Austin Cary, United States Forest Ser is available to the public on request to the Washin office of the service. It consists of three pages of and suggestions based on studies of the Forest Se and on the experience of successful operators.

U. S. GOVERNMENT PRINTING OFFIC

FOREST WORKER

November, 1927

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UNITED STATES DEPARTMENT OF AGRICULTURE

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Announcements

Foresters Urged to Test Balkan White Pine

Dr. Perley Spaulding, forest pathologist at the Northeastern Forest Experiment Station, Amherst, Mass., strongly urges upon American foresters the importance of prompt testing in this country of the Balkan white pine, *Pinus peuce.* In Europe this species has proved itself very resistant to the white pine blister rust. Doctor Spaulding believes that it will grow well in this country, particularly in the colder situations. He recommends that everyone who is in charge of planting operations within the areas infected or threatened with the blister rust procure a few hundred young trees of this species for careful test in the forest. For this purpose one-half to 1 pound of the seed should be obtained from European dealers in tree seeds and planted in local nurseries near the final planting grounds. The seed normally require a full year to germinate, but this delay can be avoided if, before being planted, the seed are treated for about 10 minutes with sulphuric acid and then washed with some alkaline solution. Germination may be hastened also by stratifying the seed over winter.

Connecticut Forestry Association Offices Moved

The offices of the Connecticut Forestry Association have been moved from Sage Hall, Yale University, to the second floor of the Bradley Building, 215 Church Street, New Haven, Conn.

American Foresters to Meet in San Francis

The annual meeting of the Society of Americ Foresters will be held in San Francisco, December and 17. It will be preceded on December 15 by conference on forest schools, and followed on Dece ber 18 and 19 by a field trip into the redwood co try. The chairman of the committee on meetings Thornton T. Munger, director of the Pacific Nor west Forest Experiment Station, Portland, Ore who is being assisted by E. I. Kotok, director of t California Forest Experiment Station, Berkeley, Ca

State Parks Conference

The Eighth National Conference on State Pa is scheduled to be held in San Francisco, June 26– 1928.

American Forestry Association Meeti

The annual meeting of the American Forestry As ciation will be held in St. Louis, February 17 and

Chamber of Commerce Conference

The editor of the Forest Worker regrets that no of the final plans for the conference on commer forestry arranged by the United States Chamber Commerce, originally scheduled for October 18 but postponed to November 16–17, did not re him in time to be announced in the Forest Wo of September. The conference was held in Chicag

Because the edition of this periodical is necessarily limited, its free distribution outside of the Government service is restricted to such persons and organizations as State forestry and conservation officials State agricultural extension directors, faculties and libraries of forest schools, and forestry associations Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy o 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

Material offered for publication in the Forest Worker should be addressed to the Editor, Unite States Forest Service, Washington, D. C.

FOREST WORKER

ashington, D. C. NOVEMBER, 1927 Vol. 3, No. 6

State Forestry

e Line Construction Meeting at Waycross, Ga.

fire-line construction meeting was held on August and September 1 at Waycross, Ga., at which seven erent outfits of machinery for making fire lines were nonstrated before a crowd of 1,000. The meeting arranged by the Waycross and Ware County amber of Commerce, and was presided over by te Forester Lufburrow.

n the morning session that preceded the demonstra- R. E. Benedict, of Brunswick, analyzed the fire blem of the region surrounding Waycross, where, said, in 15 out of 25 years there occurred periods in ch the monthly rainfall was less than 1 inch.

F. Eldredge told of the fire-line system now being eloped on the Suwanee Forest, where the land is l, with many cypress ponds and bays, and where as of young growth are interspersed among older nds. The primary system of lines now being laid cut the forest into blocks of from 200 to 3,000 es, according to the age of the timber. The fire usually centers on a highway or woods road. gs and dead trees are removed from the line and n a 30 to 60 foot space on each side of it. The line nade by plowing two furrows, 50 to 100 feet distant m each other, with a tractor equipped with a side k plow. The space between the furrows is then ned. One man or boy pilots the tractor, one man ves it, and a third follows to flip back the occasional f that fails to stay put. Two men equipped with e-flame gasoline torches set the fire, and two men h back pumps see to it that the fire does not jump furrows. A truck follows with casks of water. . Eldredge estimates the cost of a line constructed this way at from $5 to $7 a mile. Last year, he d, ponds, bays, and creek swamps were used as parts primary fire lines, but it was found that "in a period xtreme drought such places don't stay wet, and when they are more inflammable than the hill lands." mary lines are now being located on hill land wherer this is possible. The secondary system is to be rked out as it becomes clear where greater protecn is most needed. Secondary lines will vary in lth from a single plowed furrow to a strip 50 feet wide. They will often be laid between ponds and heads and along bays and swamps to protect the strips of slash pine found there. It is expected that lines must be burned annually, and that plowed lines will have to be renewed every three years.

Alex K. Sessoms described the system of fire lines which he and his associates are constructing on a tract of about 5,000 acres from which the stumps have been taken off. About seven furrows are plowed, in a line as straight as possible. The large roots are thrown out, then the ground is gone over with a double and a single disk harrow. A second such road is built 100 feet from the first, and the space between is burned over. It is expected that these strips of land will in a short time be grown over by carpet grass, which will make it unnecessary to repeat the burning. Mr. Sessoms said that he and his associates have had their worst trouble with fires in swamp land, and that they are trying to construct fire breaks even through swamps.

The field demonstration of machinery for building fire lines was held at Maryland Farms, near Waycross, on the first afternoon and second morning of the meeting. The performance of the seven outfits of machinery, which were tested in the construction of fire lines one-quarter mile long, was judged and reported on by seven men appointed in advance, and was discussed in the final session.

It was agreed that the meeting should be repeated annually, and should be broadened to include demonstrations of machinery used in the manufacture of forest products, exhibits of forest products, and demonstrations of marking and thinning timber. The Chamber of Commerce of Waycross and Ware County agreed to appoint a permanent committee to arrange for next year's meeting.

* * *

The State of West Virginia through its game and fish commission has entered into a cooperative agreement with the Federal Government for the production and distribution of forest planting stock under the provisions of section 4 of the Clarke-McNary law. For this purpose the State will establish a forest nursery on the Seneca State Forest.

Porto Rico Planting Work

By E. Murray Bruner, United States Forest Service

(Based on the annual report of William P. Kramer, Chief of the Porto Rico Forest Service, for the fiscal year 1927)

During the year ending June 30, 1927, 678,984 tree seedlings were produced in the Government forest nurseries of Porto Rico. This production was materially larger than that of the previous year; nevertheless it fell short of meeting the local demand for planting stock. A new subnursery at Utuado which was put into operation in the summer of 1926 produced this spring a first crop of 27,361 seedlings. Of the 651,623 trees produced at the Rio Piedras nursery more than half, 377,022, were distributed to private landowners and other individuals, and 104,546 went to corporations; 48,021 were apportioned to Government departments; 6,900 were used in expositions, fairs, and exhibits; 4,680 went to individuals and corporations in outlying islands; and 110,454 were planted on the insular forests.

In the plantings on the insular forests no less than 16 different kinds of trees were used. About two-thirds of these plantings, however, were of Spanish cedar, mahogany (including both the West Indian, or narrow-leaf, and Venezuelan, or broad-leaf, varieties), Eucalyptus, and casuarina (so-called Australian pine).

Some 50 exotic species were propagated during the year in the Rio Piedras nursery. To introduce successfully so many exotic species requires no small amount of experimental work, involving the exercise of great care in germination and propagation practice. The production of exotics, such as certain species of Eucalyptus, that are especially delicate in the early stages of their development has been facilitated through the construction, a few years ago, of a glass propagation house provided with a number of small movable seedbeds. In 1926, also, there was provided a lath screen to cover a portion of the area into which the young seedlings are transplanted.

The tree most in demand with Porto Rican fruit growers for windbreak planting is the casuarina. A windbreak of three rows of casuarina trees was planted on the east side of the Rio Piedras nursery in July, 1924, and the growth of these trees has been observed carefully. At the time of planting these seedlings were 6 months of age and from 12 to 18 inches high. In the year ending June 30, 1927, the smallest of the trees added 6 feet to its height, the majority grew 13 feet, and one grew 17 feet.

Through several years of experimentation it has been found that in Porto Rico certain species, especially some having rather large and hard seed, such as the maria (*Calophyllum calaba*), can be propagated more successfully, as well as more economically, by planting the seed directly in the field rather than by raising seedlings and transplanting them. During the past year a total of 7,839 pounds of tree seed, comprising seven different species, was planted on the Maricao and Guanica Insular Forests.

Arrangements completed during the past year make it possible for the Porto Rico Forest Servi offer much larger numbers of planting stock heres The capacity of the nursery at Rio Piedras was enla by the addition of 27 concrete seed beds, 25 by 4 to the 299 already in use; and as a supplement tc central nursery situated in the coastal plain a nursery was established at Utuado, at an elevati 1,000 feet. Here 210 concrete seed beds have constructed, of which half are used for the propag of coffee trees and half for shade trees for coffee pl tions and species especially suited for forest pla in the mountain region of the interior.

Michigan Law Requires Slash Disposal A Highways and Rights of Way

A Michigan law of 1927 requires the disposal w 30 days of slash from cutting of forest growth on p highways or land bordering highways, or cutting results from the construction and maintenanc railroads or telephone, telegraph, or power lin other public utilities. Such material must not b within 100 feet of the highways or railroad righ way. Dead stubs and windfalls, also, must b moved from areas cut over along highways. manner and time of disposal must be such that erty is not endangered. If the material is not dis of by the person or firm responsible for the cu within 30 days of cutting or within another 3 period following notice from the State departme conservation, it may be disposed of by the depart and the expenses recovered from the violator, whc also be punished with a fine not to exceed $100 o prisonment of not more than 90 days, or botl violation of the act results in damage or injury t property owner, the violator is subject to actio damages.

◆

The first State forest of Illinois has been accept a gift from Col. and Mrs. C. C. Judy and their dau Mary, of Menard County. The tract is locat Menard County, near the village of Tallula, anc braces 80 acres of virgin hardwood timber. It w known as the Judy Memorial Park.

◆

A memorial to the late Willard H. Jennings of chester, N. H., has been established by his wido daughter in the form of a municipal forest. Th acre tract, cut-over land partly covered with white-pine growth, is situated on a hill close t village. Its presentation featured an American Week celebration, with singing by school chi talks by foresters and town officials, and tree pla by high-school boys.

tate Foresters Meet at Hartford, Conn.

he forestry organizations of 21 States were repre- ed at the annual meeting of the Association of State esters which convened October 3 at Hartford, Conn. r taking a bird's-eye view of a large part of the e from the Travelers Tower of the Travelers rance Co., a structure 527 feet high which the necticut Forestry Department is privileged to use lookout, the party spent three days examining at r range State and privately owned forests and st plantations and a State forest nursery of Connec- t, then crossed over into Massachusetts and visited Harvard Forest, at Petersham.

t the forest plantations of the Connecticut Agricul- l Experiment Station near Rainbow, Conn., the ing foresters saw the results of an elaborate series xperiments in seeding and planting, begun by ter Mulford in 1901. The soil, a coarse sand, has found unsuitable for all but a few species of hard- ds, but experiments in the growing of conifers have very successful. In an effort to find a method of rolling the white pine weevil, this spring a small l of cotton was wrapped around each of a number ees just below last year's whorl. Trees so treated not show weevil attack, though some near-by eated trees do. This visit was followed by one to State forest nursery at Simsbury, where trees are vn for planting on State-owned land.

urning south, the party visited the Meshomasic e Forest of 3,379 acres, of which 70 acres is the first l ever purchased in New England for State forest poses, and the Saltonstall forest area of the New ven Water Co., which, like the other forest land nging to this company, is managed by Professor vley of Yale. Although the stand on the latter area been damaged through the killing by blight of the stnut that formerly constituted about half of it, through severe cutting by previous owners, under stry management it has more than paid its way the past 20 years. A change in composition is being brought about, from a pure hardwood stand a mixed stand of hardwoods and hemlock. The st includes an exceptionally fine stand of red pine, ted on open land in 1915 as three-year transplants.

t the Harris Whittemore estate of approximately 0 acres of woodland and plantations of ages rang- up to 20 years, in Middlebury and Woodbury, was an example of "estate forestry" combining hetic and commercial management.

he itinerary in the northwestern part of the State ught to view evidences of the generosity of Con- ticut people in providing land for State forests, and the State's willingness to spend money for this pose—the Mohawk State Forest of 2,500 acres, st of which was given by the White Memorial ndation; the Peoples' State Forest of 1,214 acres entirely given by the Connecticut Forestry Association through special subscriptions and direct gifts of land; and, on the Massachusetts line, the Tunxis State Forest of 3,660 acres, purchased by the State at an average price of $6.35 per acre.

Crossing into Massachusetts, the party visited one of the model miniature nurseries established by the Massachusetts Forestry Department for the educational and publicity effect. Next they were conducted by Prof. R. T. Fisher over the Harvard Forest. In this forest 11 types occur, comprising all the important types of the transition zone between the central hardwood and north woods regions. Here all the operations in the management of a tract under sustained yield, from the establishment of stands both by natural reproduction and by planting to the marketing of lumber, poles, cordwood, and other forest products, are carried on every year.

At the Harvard Forest one of the recent models of the pump chiefly used by the Massachusetts Forestry Department was shown in use. This pump, with a pressure of 85 pounds, threw a fire-fighting stream through a 1-inch hose 4,000 feet long.

Between times the travelers touched at New Haven and were entertained by the Connecticut Forestry Association with a smoker at Sage Hall, the home of the Yale Forest School, at which Dean Graves presided.

One of the evening meetings which followed the days of touring was given over to discussion of the cooperative work of the Federal and State Governments under the Clarke-McNary law. J. G. Peters, in charge of the work of the United States Forest Service under this law, presented a plan for simplifying the arrangements for cooperation in forest fire protection. He proposed that extra allotments to the States be determined on the basis of the amounts of State and private funds expended for forest fire protection during the previous year, instead of upon the basis of the amounts of such funds budgeted for expenditure for this purpose during the current year. Regular allotments would continue to be based upon the estimated cost of adequate protection. He proposed also that the States be reimbursed on a 50-50 basis until the Federal allotment is exhausted. All the State delegates present approved the suggestion. In the discussion of seed collection by the Forest Service in connection with cooperation under section 4 of the Clarke-McNary law, the State representatives were gratified to hear that some 5,000 bushels of red pine cones have been collected on the Minnesota National Forest, the seeds from which are to be distributed to the States cooperating under this section.

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The American Legion is giving Connecticut a new State forest. The legion has already presented to the State an area of 213 acres, in Barkhamsted, and intends to add to this 109 acres on which it has an option.

Cape Cod Committee Proposes 10-Year Reforestation Plan

The joint committee representing the Cape Cod Chamber of Commerce and the Massachusetts Forestry Association, under date of October 1, 1927, outlined a plan for reforestation activities on the cape for the next 10 years. This plan contemplates the establishment of town forests aggregating 10,000 acres and the extension of State forests to include a minimum of 10 per cent of the forest land; the provision of fire suppression equipment at each State forest and of a patrol truck and equipment by 10 of the towns; the maintenance of two forest fire patrolmen by the State in Barnstable County and of local patrolmen by 13 of the towns. It is also recommended that a small appropriation for trees to be given to landowners be made annually by each of the towns with waste lands; that the planting program on the present State forest be enlarged; that plantations on the Province lands, where the chief object is sand fixation, be extended; and that the output of the Shawme State Forest Nursery be increased to meet the planting needs of the cape.

Of the 252,000 acres of land on Cape Cod it is estimated that about 150,000 acres in the interior is better suited for forest production than for any other purpose. The State owns 8,300 acres in the Shawme State Forest, and a number of the towns have already established town forests.

The report, in referring to the fire protection experiment now being made on the cape, states that "the records since the beginning of the experiment show that with 11 per cent less money spent in the total cost of education, patrol, and suppression than was spent during a like period for suppression alone, the losses in acreage burned over have been reduced by 72 per cent. These results have been obtained during two exceptionally bad fire years in that district."

The report of the committee discusses fire patrol, fire-fighting equipment, insect control, blister rust, reforestation, and species for planting, and carefully points out the part in the cooperative enterprise that should be undertaken by the State, the towns, and the State forestry association. The members of the committee are Charles L. Ayling, chairman, Centerville; Edward S. Bryant, Boston; George E. Dean, Falmouth; Ralph S. Hosmer, Ithaca, N. Y.; Oscar C. Nickerson, Chatham; and Harris A. Reynolds, secretary, Boston.

* * *

A study of wood utilization in the vicinity of Hartford, Conn., is being made for the Connecticut Forestry Department by E. D. Fletcher. At present there is very little market for forest products in this part of the State, and it is desired to make information in regard to the forest resources of the territory available to industries that might in that way be attracted to it.

Four Cooperative Protection Projects i South Carolina

Organized protection from fire has just been unc
taken on four forest properties in South Carolina,
gregating 158,000 acres, under cooperative agreeme
between the State forestry commission and the own
These are the Myrtle Beach Estates, 66,000 acres;
Champion Fiber Co., 6,000 acres; the Carolina Fi
Co., 30,000 acres; and the Cooper River Timber
56,000 acres.

On the Myrtle Beach property a newly built wa
tank on a steel tower structure 125 feet high will
used as a lookout.

The Carolina Fiber Co., Hartsville, S. C., is a pio
in forest protection in South Carolina. About 1
this company undertook the protection of an 8,
acre tract of cut-over longleaf and loblolly pine 1
by means of carefully laid out fire lines around
through the property, following established roadw
so far as was practicable. This was probably the
system of fire lines constructed in the State. The l
are burned annually, and the amount of young fo
growth, 1 to 6 years old, that has been establis
within the protected blocks presents an excel
demonstration of the value of fire protection in
South Atlantic coastal plain.

Organized County Fire Protection in Virginia

Six counties of Virginia have recently been organ
for forest fire control: Rappahannock, Greene, M
ison, Warren, Orange, and Hanover. This brings
total number of counties in Virginia cooperatin
forest fire protection to 55. The 6 counties named
organized, like 13 others, according to the provis
of section 541 of the Virginia Code as amended in 1
Under this section fire suppression costs incurre
forest wardens in accordance with instructions
the State forester are paid by the county in which
fire occurs. The State pays for all forest warden
ices and furnishes tools and equipment for regist
fire crews.

In anticipation of the forming of a forest fire
tective area in the Dismal Swamp, the board of su
visors of Nansemond County have agreed to pa
suppression costs, under the law just mentioned
the part of the swamp contained in that county,
the Norfolk County supervisors have made $
available for a similar purpose for the current ye

* * *

A tract of 170 acres in the town of Plymouth,
has been purchased by the State of Vermont a
addition to the Calvin Coolidge State Forest.
other recent purchase of the State adds 226 acr
the Ainsworth Forest Park, in Williamstown Gul

New York Forestry Tour

The fourth annual Adirondack forestry tour arranged the New York Conservation Department and the m bureaus of the State was a five-day pilgrimage of people, beginning September 15. The participants st have been thinking in millions when they reached ne, for they had visited the Saratoga nursery with 44,000,000 trees and the Lake Clear nursery with 24,750,000, the watershed on which Glens Falls has 17 years planted more than 2,000,000 and the osevelt Forest on which the State planted that many t year, and even a private plantation of millions— 7,000-acre property of T. C. Luther, in Saratoga unty.

The route began in Utica and proceeded to Saratoga, Lake George, to Saranac, and back to Albany. It past old stands of white pine and of the spruce rdwood type; a forest infected with white pine blister t and one that years ago was the scene of a dis- rous fire; public camp sites maintained by the State; ookout tower and a State fish hatchery; and forest ntations of many kinds and many ages.

Airplane Proves Successful in Maine Protection Work

An airplane was used by the Maine Forest Service its fire protection work this year, and was found ry useful in locating small fires and in reconnaissance large fires. It proved especially helpful in the case a 10,000-acre fire. Twice each day an observer w over this fire and dropped at headquarters a map owing its progress and the points where it was burn- most violently. In the opinion of forest officers was largely owing to the use of the plane that they cceeded in putting this fire out without the help of n.

* * *

The seven communities of Simpson County, Miss., e competing in a year-long fire-prevention contest. the end of the year, in March, 1928, County Agent ewart will award prizes to the communities that ore the lowest percentages of timberland burned er. During the spring fire season the timbered ea burned over in the county was held to the lowest corded figure.

* * *

New Hampshire's first county forestry association s been formed in Merrimack County. Its purpose to promote farm wood-lot development, and any od-lot owner in the county is eligible for member- ip. Milton J. Walker, of Contoocook, was elected esident and Thomas J. King, blister rust control ent of the county, secretary.

A forest of 61.6 acres near Dupont, Ind., has been given to the Nature Study Club of Indiana by William A. Guthrie, former head of the Indiana Conservation Commission, in memory of his wife, Sarah Lewis Guthrie. The deed specifies that the land shall be used for the study of the native timbers of the State. The society will maintain the tract as a forest preserve and wild-life sanctuary.

* * *

The percentage of survival in forest plantations in New York State averages between 80 and 90, according to the estimate of the State conservation department. This estimate is based on the examination of more than 300 sample plots in plantations averaging 10 years of age, scattered throughout the State.

* * *

A 40-year-old stand of old field shortleaf pine on the Wharton Estate near Atsion, Burlington County, N. J., is reported by the New Jersey Division of Forests and Parks to be growing at a rate of 484 board feet per acre per year. A plot was measured in 1922 and again in 1927. This growth has taken place in spite of excessive crowding, pines over 2 inches in diameter at breast height numbering 452 per acre.

* * *

Four new steel fire observation towers are soon to be erected by the Pennsylvania Department of Forests and Waters. Two 80-foot towers will replace old towers that have become unserviceable, one near Aristes, Columbia County, and one at the Freeland platform, in southern Luzerne County. A third 80-foot tower will be located in southern Cambria County, and one with a height of 60 feet is to be erected in the Broad Top region near the county line of Huntingdon and Fulton Counties.

* * *

Agents and patrolmen of the Texas Forest Service are exempt from jury service when engaged in the regular and active discharge of their duties, according to a recent act of the legislature.

* * *

Orders received at the State forest nursery of Kentucky this spring called for 40,000 trees, as compared with only 12,000 ordered last spring. The 10,000 black locust trees available were ordered twice over. About 30 plantations were established in various parts of the State with the 30,000 trees distributed.

* * *

Late figures for this spring's forest-tree distribution by the State forestry organizations of Pennsylvania and New York are: Pennsylvania, 14,229,514; New York, 21,564,175.

Education and Extension

Loan Fund for Minnesota Forestry Students

A fund of $4,000 from which loans may be made to worthy and needy students of forestry has been given to the University of Minnesota by Mrs. Emily Speechley Whitacre, of St. Paul. The gift is to be known as the Mary Dwight Akers loan fund, in honor of the chairman of the outdoor life committee of the fourth district, Minnesota Federation of Women's Clubs.

Oregon Degree Course in Lumber Manufacture

A degree course in lumber manufacture is being introduced this year by the Forest School of the Oregon State College, in response to local demand. With basic work similar to that in the technical forestry and logging engineering courses, the new course will place special emphasis on wood technology, lumber grading, kiln drying, sawmill construction, and lumber salesmanship.

Short Timberland Management Course at Wisconsin

A new short course in timberland management is offered this fall by the department of agricultural engineering, College of Agriculture, University of Wisconsin. Raphael Zon, director of the Lake States Forest Experiment Station, and F. G. Wilson of the college staff, are in charge, assisted by R. D. Garver and Arthur Koehler of the Forest Products Laboratory, State Forester C. L. Harrington, and District Forest Inspector C. A. Hoar. The course, scheduled for October 31–November 18, was offered free of charge, with the attendance limited to 20 men. It was planned to begin with an analysis of present forest management practice and to give most of the time to selective logging and improvement of the stand, to touch on the growth habits and requirements of the most important trees of the region, and to give the fundamentals of forest fire protection and of land surveying and mapping. Visits were to be made to an organized fire protection district of Wisconsin, the State forest nursery, and old pine plantations, and the last week was to be spent in camp studying selective logging operations.

* * *

Trees planted by Camp Fire Girls this year, according to reports received at national headquarters by September, numbered at least 70,000.

Washington State College Enlarges Clark McNary Nursery

The forest nursery of Washington State College h recently been enlarged from 10 to 21 acres. "Prac cally all the stock distributed for planting in Washir ton," writes Asst. Prof. Charles M. Genaux, "must large transplants with well-developed root systen capable of surviving on more or less adverse sites. Th is especially true for eastern and central Washingto where the annual rainfall seldom exceeds 20 inches a often falls to 10, with most of the precipitation comi during the winter months. A considerably larger ar must be kept in tree production than would be the ca if the planting stock could be shipped as two or thr year seedlings."

Improvements to this nursery this year include packing and storage shed and 1,500 feet of additio water-pipe line. Open-ditch irrigation was successfu used this summer to water coniferous and hardwo transplants and hardwood seedlings.

Mississippi Prize Poster Contest

A poster contest in which $160 is offered in prizes l been announced by the Mississippi Forestry Comm sion. First and second prizes of $25 and $15 will awarded to the winners in each of four classes—coll students, high-school students, grade pupils, and general public. Either forestry or other conservat subjects may be used. The contest closes Decembe and the awards will be announced on December Mississippi's winter Arbor Day.

Farm Bureau Forestry Tours in Californi

California farm bureau officials have turned the l of the tour to good account, taking farmers on "p sonally conducted" tours to see the good and the b in forest-land management. In February of this y farmers of Los Angeles County were taken to see a f est nursery, a forest plantation, fire lines, and a protection district. In June farm people of Santa C County were conducted through second-growth r wood, a recent burn, and a piece of newly cut-over la visited a lookout station, and heard talks on refores tion, forest protection, and forest research.

The first trip attracted 100 "tourists" and the sec 125. A third is planned by the Orange County Fa Bureau for November.

mmer Camp Work Now Required at Colorado College

The forestry department of the Colorado Agricul- al College this year has a freshman class of 50. Its al enrollment is 113, or about 13 per cent more than any previous year. Beginning with this year's ering class 11 weeks' attendance at summer camp, etofore optional, will be required of all candidates the bachelor's degree in forestry. The forestry np, located 50 miles west of Fort Collins with 800 es of college-owned forest land in the vicinity, now s a good motor road to its front door, a new bunk- use, and an electric-light system.

The majority of the upper-class men in the depart- nt are specializing in range management.

nnsylvania School Children Report White Pine Blister Rust

Pennsylvania school children are taking part in a ate-wide search for white pine blister rust on currants d gooseberries. Instructions, with colored pictures owing infected gooseberry and currant leaves, and port forms to be mailed with sample leaves from spected plants, were distributed by the State bureau plant industry in September to more than 14,000 hool teachers. Within that month the children und rust on cultivated Ribes in at least eight counties m which it had not before been reported.

California Four-H Camp in Use

The Four-H Club camp in Whitaker's Forest, Tulare unty, Calif., plans for which were described in the rest Worker of May, 1927, went into use on June 13. e cost of developing the camp, which amounted to ,185, was shared by the farm bureaus of Fresno, ings, Madera, Kern, and Tulare Counties and the ricultural Extension Service. Most of the labor s contributed. E. G. Dudley saw to the scheduling the volunteer labor; Earl Wortman, operator of a ighboring sawmill, furnished the lumber on generous rms; and Carl Pennebaker, a contractor of Exeter, ve two days' work of four carpenters.

Features of the camp are a 16 by 36 foot cabin sur- unded with a rustic porch, a hotel cooking range, a ning platform accommodating 125, an 80-gallon hot- ater tank, and a swimming pool surrounded by quoias.

During the summer the camp was visited by more an 400 children.

* * *

Forestry exhibits of the Alabama Commission of orestry were scheduled to be shown this fall at 12 fairs different parts of the State, the series concluding ith the State fair at Montgomery, November 7–13.

Forest Study Begins with First Grade in Ida Grove, Iowa

Even first-grade children are studying trees in Ida Grove, Iowa. Miss Grace Jones of the Ida Grove schools last year devised a program of tree study for primary pupils that included lessons for fall, winter, and the spring planting season, visits to the woods, and the preparation of a window exhibit for American Forest Week. The children made tree books with pressed leaves and kodak pictures, identified local species by shape and bark, heard something about the uses of certain kinds of wood, and learned what kinds of trees are desirable for street and lawn planting in their town. With the tree lessons were correlated lessons in music and art appreciation. In the American Forest Week exhibit which the children helped their teacher to prepare, twigs of different trees were arranged together with charts showing the leaf, bark, seed, and bud of each, samples of the wood, and kodak pictures of the trees. In the background were reproductions of paintings by Corot.

* * *

On the demonstration forest presented some 20 months ago by Charles Lathrop Pack to the College of Forestry of the University of Washington, the college has now established a small nursery, a miniature forest showing how a Douglas fir forest on a 60-year rotation is handled, a model camp, and five experimental plots planted to different species of trees. A system of signs calls the attention of the passer-by to the forest and explanatory signs accompany all the exhibits. Professor Kirkland had a crew of from 10 to 12 men at work all summer building roads and trails, and as soon as the tract is properly opened up it is planned to start experiments in thinning and utilization. During the summer the forest had several hundred visitors.

* * *

A three-day trip to the Lava Beds National Monument was the reward of the six school children of Modoc County, Calif., who won first place in fire-prevention essay contests for certain school grades during American Forest Week of this year. The six children winning second place were taken on a one-day trip to Happy Camp Lookout and Pit River Ranger Station. Eli Dale, veteran lookout man, explained to them how fires are detected and reported, how to read the wind gauge, and how to take humidity readings.

* * *

A hillside area only one-quarter mile from the town limits and plainly visible from the town square of Sayre, Pa., has been donated as a school forest by J. B. Knapp, a local florist. Under the direction of District Forester E. Fred Brouse, freshmen boys of the Sayre High School this spring planted on it 3,000 forest trees.

The Mississippi Forest Service, with the cooperation of the State extension forester, is putting on exhibits this year at eight fairs in the State. The exhibits cover uses of certain native Mississippi woods, fire, influence of forests on run-off and erosion, and the contribution of the forests to the needs of everyday life. The fairs have been grouped in two circuits, for which duplicate exhibits have been prepared, the State supervisor of forestry education being in personal charge of one circuit and the extension forester of the other. One of the eight fairs is not included in either circuit but will have a special exhibit in charge of a local official.

* * *

School children of Central City, Somerset County, Pa., this spring celebrated Arbor Day by planting 70,000 trees on the watersheds of the vicinity. Added to their plantings in the three preceding years, this brings the total to 259,000 trees.

* * *

Projects undertaken by members of the Louisiana reforestation clubs were successfully completed this year by 130 boys. The boys who got the best results were rewarded with prizes totaling $742. Contributors to the prize fund included the Great Southern Lumber Co. and the Southern Pine Association.

Extension Forester Bode of Iowa has asked the cl dren of the State to help find better varieties of t native nut trees for propagation. Prizes are offe for the best black walnuts, butternuts, shagbark a shellbark hickory nuts, pecans, and hazelnuts ente by children and young people between the ages of and 19, in county and State contests.

* * *

Twenty-seven forestry students of the Iowa St College spent the past summer in forestry camp on shore of Lake Au Train, Mich. In addition to wo work they had the opportunity of studying near logging operations and a large paper plant at the to of Munising. Visits were made to the large sawmill Sault Ste. Marie and to Canadian as well as Ameri paper plants. Profs. D. S. Jeffers and Perkins Cov were in charge.

* * *

More than 600 California boys and girls attend Four-H club camps this summer were led on fores hikes by Extension Forester Woodbridge Metcalf.

* * *

The Forest School of the Louisiana State Univer reports the enrollment of 31 freshmen this year, against 12 last year.

Forest Service Notes

An Experiment in Lodgepole Pine Utilization

By J. C. Kircher, United States Forest Service

The most important product obtained from the lodgepole pine stands of the national forests is railroad ties. Wherever stands are fairly accessible, timber of sizes suitable for hewn ties is in good demand. The trees best suited for hewn ties are those from 11 to 14 inches in diameter at breast height. Operators will accept for this purpose trees with diameters up to 16 inches or, occasionally, to 17 inches.

Good silviculture requires that when a large percentage of the tie-size trees is removed from a stand of lodgepole pine nearly all the larger trees and a number of the suppressed and defective smaller ones be cut also. Here is where the trouble comes in. In some of the national forest stands smaller trees can be marketed for use as mine props, mine ties, and cordwood, but ordinarily the market can by no means absorb the amount of small material that should come out at the same time with the ties; and for the trees too large for hewn ties there is usually little demand.

In national forest sales of the last few years, o ators taking lodgepole pine for hewn ties have b required to take also most of the larger trees. Ur this requirement it has become common for opera to bring small sawmills into the stands and saw larger trees into ties. The problem of using the mendous amount of small material from the sale ar however, still remains largely unsolved. This s material includes tops up to 9 inches in diameter well as the great number of small trees from 4 t inches in diameter that ought to come out if the sta are to be put into condition for accelerated growt

The national forests in Colorado, and to some ex those of southern Wyoming, have developed mar for a good deal of this small material. Some such r ket exists also in eastern Montana. For the Wyon forests of the Intermountain National Forest Dist however, practically no such market exists.

Foresters of the intermountain district have some time been experimenting in the use of lodge pine for fence posts, creosoting the posts in a small home-made plants by the open-tank met Their experiments have shown that this species m smoother and better fence post than northwestern lar, and if creosoted outlasts it. In order to develop narket for the fence post of lodgepole pine as a com- itor with the cedar post, however, it was necessary find an operator willing to experiment.

Such an operator has now been found, on the Targhee tional Forest, in Wyoming. To start things, the trict has given him the trees selected on a silvicul- al basis for removal from an area of about 60 acres. e stand of the cutting area was about 100 years old, l the dominant trees averaged about 6 inches in meter at breast height. Twenty-five carloads of terial have been taken off the area. A few ties re cut, but the bulk of the product consisted of -foot stockyard posts, fence posts, and poles to a nimum diameter of 3 inches. The posts, after soning, will be creosoted by the open-tank method. curate operating costs are being kept, and, of course, ling prices will be recorded.

The area has been heavily thinned, and now contains excellent stand of well-formed, long-crowned, domi- nt trees, so spaced that they should grow fast. It one of the finest cut-over areas in the lodgepole pine gion, and demonstrates the best of forestry practice. mple plots have been laid out for the study of growth er cutting, so that even if the marketing of lodgepole e fence posts on a large scale does not become a lity much useful information will be collected.

Since Wyoming, South Dakota, eastern Colorado, braska, and Kansas consume very large quantities fence posts, success in marketing lodgepole pine nber of the national forests in the shape of creosoted nce posts would open up a large field for better ilization and for better silviculture.

rosion Study in Barranca Canyon, Calif.

In the Barranca Canyon, near San Bernardino, alif., preparations are being made by the California orest Experiment Station for a study of erosion. he canyon was burned over in 1925. The slopes and ils of the area are typical of those found in southern alifornia, and before the fire there was a very dense ver of chaparral. A dam 75 feet wide and 20 feet gh is being installed to form a settling basin to catch e eroded material from the denuded slopes, and ream flow will be measured at two points within the nyon. Meteorological equipment is being installed get the effect of the various types of storms upon osion and the recovery of the chaparral. In this roject the Forest Service has the cooperation of the eological Survey and the California division of restry and a number of southern California agencies, cluding the Tri-county Forestation Committee, the ities of San Bernardino and Redlands, and the counties f Los Angeles, Santa Barbara, San Bernardino, and an Diego.

Growth of Planted Slash Pine

The Government's first experiment in transplanting slash pine was made only 11 years ago. In June, 1916, Extension Forester W. R. Mattoon made a trip over the property of the East Coast Lumber Co., near Watertown, Fla., with M. B. Wilder, the company's woods superintendent. Many vigorous young slash-pine seedlings in the midst of their first growing season were noticed near the company's camp, and it occurred to Mr. Mattoon to try transplanting some of them. Although the season was obviously unfavorable for such an effort, 50 of the trees, which at 6 months of age were about a foot tall, were dug up and sent by mail to Summerville, S. C. There they were planted at the branch experiment station which the Clemson Agricultural College maintains to test the agricultural development of poorly drained cut-over pine land on the coastal plain. Later in 1916 Mr. Wilder made a commercial collection of slash pine seed, and in the following spring some of this seed was used by the Forest Service, in cooperation with the college, in making at Summerville what is believed to have been the first experimental sowing of slash pine in the United States.

This senior plantation and sowing of slash pine developed very satisfactorily. When measured in the early spring of 1927 some of the 11-year-old planted trees were 9 inches in diameter at breast height and 30 feet tall. At the same time the trees grown from seed, on wet land, measured up to 7 inches in diameter and to 25 feet in height.

National Forest Roads and Trails

The national forests got 1,370 miles of new roads and 4,987 miles of new trails in the fiscal year 1927. Of the roads 292 miles are major highways and 1,078 minor roadways. The cost of all the new roads was $7,713,535, of which $925,879 came from local cooperative, State, and county funds and the rest from Federal funds. The cost of the trails was $946,622. In addition, $1,593,950 was expended during the year in maintaining roads and trails.

The new work brings the total of completed roads on the national forests on July 1, 1927, to 13,219 miles and the total of completed trails to 31,607 miles. For all construction and maintenance of roads and trails on the forests the Government has spent $63,989,508 and local cooperators have contributed $15,611,956.

The road system of the national forests now includes 39,448 miles, of which 15,994 miles are considered to meet satisfactory standard. The trail system totals 85,892 miles, of which 73,431 miles is considered satisfactory.

Proposed additions and improvements to complete the system of roads and trails and bring it up to standard would require the expenditure of $177,124,616, according to present plans.

Zinc Sulphate for Weeding Seed Beds

By W. G. WAHLENBERG, United States Forest Service

At the Savenac Forest Nursery, in western Montana, hand weeding of seed beds has been largely displaced by a method of weed control that is much cheaper and that does not cause disturbance of the roots of tree seedlings. This has been made possible by the discovery that zinc sulphate solution of a certain strength kills the seed of most of the weeds that give trouble in the nursery but does not injure the seed of the principal conifers grown there.

In 1915, in the course of experiments with sulphuric acid as a disinfectant against damping-off fungi, it was observed that the application of the acid to plots of soil reduced weed growth. Hand weeding was an expensive item at Savenac, where 3,000,000 coniferous seedlings and transplants were being produced annually, and since the seedlings were grown in stands often as close as 100 individuals per square foot there seemed to be no hope of finding a way to weed them by mechanical means. The possibility that help might be found through chemical treatment was therefore followed up with experiments covering a period of 10 years, which led to the development of a simple method that combats weed growth by preventing the germination of weed seeds.

The treatment consists in applying to every square foot of seed-bed area 8 grams of zinc sulphate dissolved in 250 c. c. of water. This means 1⅛ ounces of zinc sulphate in a quart of water on each 4 square feet of seed bed. The application is made immediately after the seed are sown.

The weeds most troublesome in the nursery were species of sorrel, timothy, and clover. The three tree species that formed the bulk of the nursery's annual output, and with which the chemical treatment was thoroughly tested, were western white pine, western yellow pine, and Engelmann spruce.

Results varied a little from year to year, but each trial effected a reduction of from 80 to 100 per cent in the number of weeds present in the seed beds for two seasons following the application. The treatment did not kill advance growth of weeds, nor pieces of roots or underground stems left from hand pulling, but it did prevent the germination of most of the weed seed. The seed appeared to be killed just after breaking their seed coats in an attempt to germinate. The treatment seemed to be especially fatal to clover seed, and effective on most of the other native weed seed. In general the grasses were observed to be least affected.

The zinc sulphate treatment tended slightly to hasten the germination of pine seed and increase the number of individuals sprouting. Careful comparisons of the behavior of stock from treated and untreated soil during the various steps in nursery culture and for the first three years after field planting did not show that the treatment was in any way detrimental to the development and survival of western white or weste yellow pine stock. It did not hinder germination Engelmann spruce and Douglas fir. Apparently did reduce the germination of western red cedar, pro ably because the seed coats of this species are so thin.

In using this treatment care must be exercised bring about an even distribution of the chemic The Savenac experiments indicated that the app cation of as much as 10 grams instead of 8 to t square foot injures about 7 per cent of the growi root tips of the trees, and that an increase of the ov dosage steadily increases the injury.

At the Savenac nursery the zinc sulphate did prevent the use of field peas as a green fertilizer crop apparently because much of the original dose of z sulphate had been leached out of the soil before pea seed were sown. In fact, in the case of peas gro on treated soil nodule development, and hence nit gen fixation, were markedly stimulated.

Most of the trials of this method of weeding at Savenac nursery were on the native soil in its natu state. The nursery soil had good physical propert granular structure, and highly oxidized soil miner There was a fair amount of organic matter, but mu of it was not well decomposed, or the "humifie organic material may have been a little lower th usual. There was no lime in the form of carbona When tests were made on flats of pure sand in greenhouse a loss of effect on the weed seed was not and on nursery plots freshly fertilized with dried bl and ground bone or with sheep manure the treatm was 17 to 18 per cent less effective. On sand the low ing of efficiency was probably due to too rapid leachi On the fertilized soil the cause seemed to be associa with the greater abundance of organic matter, but slight loss of efficiency was reduced by plowing otherwise working the fertilizers deeply into the zone of the soil.

A disburbance of the soil such as that produced pulling trees for planting seemed to make it poss for weeds to start growing on the treated areas. T made at the Forest Products Laboratory two ye after the treatment showed small quantities of in uble zinc in treated soil and in the ashes of trees gr on it, but revealed no traces of soluble zinc remai in the soil. Thus it appeared that a new applica of the zinc sulphate was needed every second year.

It was necessary to keep in mind the possibilit damage to the soil from the cumulative effect repeated applications of the zinc sulphate. At Savenac nursery, where the soil seemed to be natu acid, soil acidity was not noticeably greater in treated than in the untreated areas, but the nat reaction of the soil made it necessary to apply l Independently of its neutralizing action on a lime is said to inhibit the toxic action of zinc on pla It was tentatively decided that when a second tr ent was needed on a given area only 4 grams of zinc lphate per square foot, or half the amount originally ed, would be applied.

Few attempts were made at Savenac to apply the eatment to transplant beds. Because of the wider acing of the trees, the cultivation of the soil, and the fferent method of irrigation, it may not be found actical for transplants. From the seed beds alone, wever, there was reported an annual saving in labor sts of about $353, or 32 cents per bed of 48 square et. In addition to this a considerable saving was of urse effected through eliminating the mechanical mage to seedlings that inevitably results from hand eding.

ests on Extinguishers for Spot Slash Fires

A double-action back-pack pump with 5 gallons pacity is the best equipment for putting out spot es in slash. It can be run for about 20 minutes thout refilling and is effective in putting out large ot fires that develop intense heat.

This conclusion is the result of tests with six kinds fire extinguishers, all chemical except the back-pack imp, conducted by E. I. Kotok on the Stanislaus ational Forest this summer. None of the chemical tinguishers tried had more than a 1-minute run of aterial. As the extinguishers are effective only on es that can be completely immersed in that short me, they are useful only on very small fires.

For all-around use on a tractor the "fire gun" was und most suitable, one of the chief reasons being its fectiveness in putting out gasoline fires. Other tinguishers were more effective on the slash fires but ere found not suitable for tractor attachment. The sts were made on fires 9 to 20 square feet in size set a windrow of unpiled sugar pine-white fir slash and standard Forest Service slash pile.

Reproduction on a Kaniksu Burn

More than half a million seedlings per acre are growng on a sample plot in a 60,000-acre area of the Kaniksu National Forest that was burned over in the ummer of 1926. Men of the Northern Rocky Mounain Forest Experiment Station who examined 62 ilacre quadrats of the area, known as the Granite reek burn, found seedlings of seven species present in he following numbers, per acre:

White pine	11, 500
Larch	11, 000
Engelmann spruce	10, 000
White fir	6, 000
Douglas fir	500
Red cedar	329, 000
Hemlock	207, 000
Total	575, 000

Game in the Southern Appalachians

By E. H. Frothingham, United States Forest Service

A new game preserve of 20,000 acres has been established by the State of North Carolina on Federal land at the head of South Toe River, on the slopes of Mount Mitchell. Other preserves on private as well as Federal lands are being talked of. The remoteness of the mountains, which makes them ideal game coverts, is a remoteness that attracts the nature lover and the hunter, and the establishment of preserves is a wise move in anticipation of increases in the drain on wild life.

This fall, however, wild life has been decidedly on the increase in the Southern Appalachians. Investigative bears have visited the Bent Creek laboratory of the Appalachian Forest Experiment Station. On the Pisgah Game Preserve there has been an increase in the deer population. An excellent motion picture of deer, elk, buffalo, and other creatures of the open spaces was taken without much difficulty on the Pisgah preserve by Supervisor Mattoon and the Asheville Chamber of Commerce. Squirrels, turkeys, and wild rabbits are abundant.

It seems likely that this increase in wild life is connected with improvements in forest fire control, and the two are being thus related in the public mind. Forest fires destroy young animals, eggs, and fledglings. The sporting touch looks like a gateway to the sentiment for forest protection down here.

In this respect game is an asset to forestry, but some forms of wild life are a liability because of depredations on seed, seedlings, and young trees. Forest nurseries in the woods, seed spots, and stored seed at the Bent Creek laboratory have recently fallen easy prey to rodents.

Recent forestry meetings have given special attention to the problems of game and the wild life of the woods. The North Carolina Forestry Association devoted a session to the subject, and advocated the study of the life habits of game and other wild life as a basis for their management in the forests. The Appalachian Forest Research Council, at its meeting in October, recommended that a specialist from the Biological Survey be assigned to the Appalachian region to work in cooperation with the forestry agencies "on problems relating to game and other wild life, as a part of the comprehensive management of the forests."

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Eighteen radio talks on forestry are scheduled to be broadcast between October 31 and April 27 as a part of the Department of Agriculture's program. Ninety broadcasting stations, representing all parts of the country, have been signed up to use some or all of these talks.

Smokers' Code

By John D. Guthrie, United States Forest Service

The number of forest fires recorded as caused by smokers has in general increased steadily since 1922, the year when the Forest Service began to classify fires under this cause. We are not here concerned with the possibility that much of the evidence against the smoker may be circumstantial or that the number of people who smoke may have increased tremendously since the war. Nor are we concerned with the question whether the match or the cigarette, the pipe or the cigar, has been more to blame, or whether the guilty "fag" is a tailor-made one or not, but solely with an effort to prevent the causing of fires by smokers.

In view of the menace of smokers' fires, the question of a smoker's code was fully discussed at the forest supervisor meetings in the North Pacific National Forest District this spring; advice and suggestions were requested from the State foresters and fire associations in both Oregon and Washington; and finally a code was evolved. The district office sent copies of this code to the 700 Oregon and Washington newspaper editors. The point was emphasized to the editors that unless a larger percentage of the public was careful about smoking in the forests continued closing of forests would result. Copies of the code also went to the State hotel men's associations, State motor associations, all city offices in Portland, sportsmen's associations, six transcontinental railroads, cigar, sporting goods, and hardware stores, and other agencies. Fourteen broadcasters in the district agreed to put the code on the air. The newspapers ran the code and many had editorials on it; the Oregon State editorial association passed resolutions on it; each of the six railroads distributed it in their smoking cars or diners; and stores displayed it in their windows. Three portable folding exhibit panels playing up the code were circulated.

A total of 3,000 signs, 14 by 22 inches, and 20,000 cards, 3½ by 5½ inches, were printed by the Western Forestry and Conservation Association and distributed by this association and by State foresters, fire associations, and the Forest Service.

The smokers' code is:

FOR THE DRY SEASON

Dangerous to smoke—
  While Traveling—
  On forest, brush, or grass land.
Smoke only—
  1. While stopping in a safe place clear of all inflammable material, or
  2. During or right after a heavy rain, or
  3. Inside a vehicle on two-way highways, or
  4. Above timber line
After Smoking—
  Put out all lighted material.

Pennsylvania Virgin White Pine and Her lock Area Offered to the Government

One of the few remaining stands of virgin white pi and hemlock timber in the Eastern States is t Hearts Content Forest, in Warren County, Pa. T timber is being cut. Wishing to see a part of the sta preserved in its wilderness beauty, the owner, t Wheeler & Dusenberry Lumber Co., has offered give 20 acres of it to the Government. The gift a represents some of the best mixtures of pine and he lock that dominated the virgin forests of Pennsylva and for two centuries upheld the appropriateness the term "Penn's Woods." It lies within the bou aries of the Allegheny National Forest and will made a part of that forest. As nearly as possible will be kept intact from outside influences, enabl foresters to study the cyclic changes that take pl naturally in a virgin stand of white pine and hemlo

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Government Gets Option on Waterville A

An option on the entire Waterville Valley in White Mountains of New Hampshire has been tained by the Federal Government. The opt covers more than 22,500 acres, including the M River Notch and the Greeley Ponds. The provisi of the option will permit a large portion of the old mature timber to be cut and taken out by water such a manner as to protect the ponds, the notch, other scenic areas. They also include protection the lands that are cut over, the leaving of adequ seed trees, and the withholding of a large area of yo growth until mature. If the purchase of the land the price and under the conditions specified in option is approved by the National Forest Reservat Commission, Congress will be asked to make a spe appropriation for the purpose. If the purchase is co pleted, the area will become a part of the Wl Mountain National Forest.

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The Ocala division of the Florida National Fo has been segregated, by Presidential proclamation the Ocala National Forest. The new administrat unit thus created has a gross area of 252,000 acres which 158,622 acres is Federal property.

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The herbarium of the Forest Service, in Washingt now includes nearly 60,000 range plants, represent about 6,000 distinct species. In the 20 years since herbarium was begun, contributions have been m to it by approximately 1,000 collectors.

General Forest News

Dying Oaks in the Southern Appalachians

By R. E. Balch, United States Bureau of Entomology

Throughout the Southern Appalachians a great num-
r of dying oaks have been noticed by foresters during
e past two years, particularly in 1927. Something
milar took place in the same region in 1914–1916.
etween July 1 and September 30 the leaves on these
ks, or on several of their main branches, suddenly
ithered. Trees so affected usually died during the
llowing summer.

No individual insect or disease can be held responsi-
e for this death wave, so far as I have been able to
scover by examining a number of the oaks. The
use seems rather to have been a combination of
dverse circumstances. In almost all the cases ob-
rved the oaks were individuals of slow or very
oderate growth suffering a loss of vitality from over-
aturity or competition. The exceptional drought of
925 caused many oaks to shed all their foliage in mid-
mmer, and the late frosts at the end of April, 1927,
ompletely killed the new foliage. The unfavorable
imatic conditions made the less vigorous trees subject
attack, and at least three insects and one fungus
eem to have had a part in the undoing of these trees.

The results of my observations, carried out in
ugust and September, 1927, are as follows:

All the dying oaks noted were of the black, red, or
carlet species. White oaks, though commonly adja-
ent, were in no case found dying. The majority of
he dying oaks were from 80 to 110 years old. Practi-
ally all were dominant mature trees 10 to 24 inches in
iameter and 55 to 65 feet in height. A few, however,
vere intermediate, some only 5 or 6 inches in diameter.
All the trees had made rather poor growth for 10 years.

On most of the trees branches had died in previous
ears. A good many of the trees appeared to have
lied in sections, from the top down. In some of them
he top of the crown was leafless and the middle sec-
ion bore brown foliage, only the foliage of the lower
ranches remaining green.

A good many had rot both in the top and at the base
of the trunk. This was often associated with the
work of *Prionoxystus robiniae*, which had done a good
leal of damage sometimes at the base and sometimes
n the larger branches and upper trunk. There were
ndications that the older trees had been attacked for
a number of years by Prionoxystus, with which near-by
iving oaks were often severely infested. The roots
frequently showed mycelium of the Armillaria fungus
and the work of a borer Prionus. All the trees showed
various degrees of infestation with *Agrilus bilineatus.*

In 1914 W. H. Long investigated the death of chestnut and oak in Chenango County, N. Y., and Brim County, N. C., and found the root fungus (*Armillaria mellea*) present in 130 of 477 oaks examined. These dying trees were of all diameters from 2 to 18 inches. Mr. Long believed that under certain conditions the fungus was a primary cause of death, and mentioned as contributing causes two late frosts in 1913.

In 1916 F. C. Craighead, investigating dying oaks in the Southern Appalachians, found the Armillaria fungus and a Prionus larva present in the roots as well as Agrilus in the trunk, although in some dying trees he found no sign of insect attack. He attributed death not to any certain insect or disease but rather to a combination of factors, some purely physiological.

In 1915 R. N. Chapman gave an account of the killing of oak in Minnesota where many areas of several acres each had been devastated. *Agrilus bilineatus* was always present. The insect seemed to prefer weakened trees but in some instances had attacked trees showing no recognized sign of low vitality. White oaks seemed less susceptible than red or black oaks. Armillaria was usually though not always present and seemed in many cases to have been the cause of weakening. Mr. Chapman thought that the fungus might sometimes have been the primary cause of death. However, he observed some dead trees, girdled by Agrilus, that showed no evidence of the fungus. Sometimes the "dead" trees sprouted from the roots, a fact suggesting that the trouble was above ground.

In 1926 J. A. Beal examined oaks dying in Bland County, Va., and found no insects that were likely to have caused death. These trees were mainly large and overmature. Mr. Beal believed that the late frosts of May 26 and 27, 1925, were chiefly responsible for the condition. In this case the dead trees included a large proportion of white oaks, probably because these were in a more succulent condition at the time of the frost than the other species.

Probably there is no definite primary cause of this periodic heightening of mortality among oaks, unless it be drought or a combination of drought and late frosts. It seems clear that unfavorable climatic conditions make the less vigorous oaks in the forest susceptible to attack by Armillaria, Prionus, or Agrilus. Perhaps any one of these, or any combination of them, may be the final cause of death.

Apparently no control can be suggested other than a system of management that will remove all unhealthy trees and maintain the vigor of the stand.

A County Assessor Lists Fire Losses

By E. I. Kotok, United States Forest Service

Losses in assessments sustained by Siskiyou County, Calif., in 1926 through forest fires are given considerable space in the annual report of County Assessor R. R. Smith, in which are listed three fires that reduced the county's assessed valuation by $125,615. These three fires burned over 4,729 acres belonging to the Pickering Land & Timber Co., 10 sections of Algoma Lumber Co. lands, and 23 sections owned by the Central Pacific Railway Co. The editor of a county newspaper, in commenting on the report, points out that in addition to the $125,615 loss in assessed valuation, there was a loss of something like $2,000,000 in wages and manufactured products that would have been obtained from the burned stumpage. Also the $50,000 spent in suppressing the fires could have been used to greater advantage for schools and roads.

Coal Company Makes Good Showing in Forest Fire Protection

The Pennsylvania Coal Co., owning about 20,000 acres of second-growth hardwood lands in northeastern Pennsylvania, employs nine crews of six men each to protect its lands from fire. While not on fire duty the men carry on improvement cuttings and thinnings. Five years' progress in economical fire protection is shown by the following figures, compiled from detailed records of fires on the company's lands within that period:

Year	Number of fires	Total cost of fire protection	Average cost of protection per acre	Per cent of total area burned
1922	45	$317.78	$0.02	6
1923	52	228.13	.01½	10
1924	15	237.62	.01½	3½
1925	16	451.14	.03	4
1926	18	108.54	.007	2

* * *

A reforestation conference of Wisconsin and Michigan lumbermen was held in Green Bay, Wis., on August 23 at the call of the Northern Hemlock and Hardwood Manufacturers Association. The members of the newly created State conservation commission were present. Forestry practices were explained to a gathering of 120 by Raphael Zon, Carl Stevens, George Banzhaf, and Marcus Schaff. It was announced that the Goodman Lumber Co. will practice selective cutting after January 1, 1928, and that the Kimberly-Clark Paper Co. and other large concerns represented in the conference will investigate the possibilities of such practice for their lands.

Paper Company Encourages Farm Forest

F. M. Brown, general manager of the Halifax Pa Corporation, Roanoke Rapids, N. C., is maki better timber growers of the farmers from whom buys lumber. He advises them to select trees cutting in such a way that they may market so pulpwood every year and make their timber a perpet crop. To induce the farmers to do their wood cutti at seasons when other farm work is not pressing, stops buying wood at the beginning of the plowi season, and except for a short period in the ea summer does not begin again until after harve In these efforts to encourage good farm forest practices he has the vigorous cooperation of bo County Agent W. O. Davis and Extension Fores R. W. Graeber. Looking forward to a long term dealing with the neighboring farmers, during depression brought on by the overproduction of cott in 1926 Mr. Brown continued to pay $6 a cord pulpwood, though he could have gotten it for "We are not in the paper mill business as philanth pists," he explains. "We want to deal with farmers so as to continue the paper business for hundred years and never strip the country. I following only what I think is horse sense."

Profitable Fire Protection

A fire-protection force was organized by the Gr Southern Lumber Co. last year, for the first time, guard its property of 80,000 acres in Mississippi. few men were engaged solely for fire protection wo and all the company's employees were made subj to call in case of need. The time spent by the latte fighting fires was charged to "fire suppression." the year ending April 1, 1927, this protection serv cost $3,604, or 4½ cents per acre. In that 12-mo period 1,398 fires originated from the compan logging operations on its Mississippi land; but spread of these fires was held to 402 acres—less than o third acre each. Only 14 of the fires burned m than 10 acres, and 1,255 burned less than one-qua acre each.

The net expense of the protection which the system gave to the company's young timber seems have been less than nothing, for the amount sp on protection did not equal the damages paid by company in the preceding year to owners of adjoin lands to which its fires spread, plus the loss it sustai in that year through the burning of logs piled along railroad right of way. At the same time the comp realized a gain in the good will of its neighbors.

* * *

Army purchasing agents are now being instruc to purchase short-length and end-matched lumbe all cases in which the use of such stock is practica Assistant Secretary MacNider has announced.

uilding Conference Adopts Code to Prevent Termite Damage

The Pacific Coast Building Officials Conference, eting on October 18 at Phoenix, Ariz., adopted et of rules suggested by the Department of Agri- ture for the prevention of damage to buildings termites, making these rules a chapter in its uniform lding code. The rules adopted make specific uirements in regard to the preservative treatment wood that is to be placed in contact with or near earth, the use of Portland cement mortar for ing and capping masonry foundations, and the vision of metal termite shields around the surfaces foundations. The suggestions that led to this ion were brought before the conference by Thomas Snyder, Bureau of Entomology; George M. Hunt, rest Products Laboratory; and Reginald H. Colley, reau of Plant Industry.

ld Field Returns Good Profit in Timber

A 2½-acre field on a farm near Howison, Miss., andoned as a field-crop area 50 years ago, has ently yielded a timber crop worth $600. The ber was longleaf pine with which the field had been seeded naturally and which had been given no atten- n except for some protection against fire. About 00 trees were cut, and nearly every one of them de two poles. The return to the owner, Joseph iller, was nearly $5 per acre for each year of the pine- wing period. According to the estimate of W. R. attoon, extension forester of the United States rest Service, it might have been nearly $10 per acre the farmer had done his own cutting, used his own am for hauling, and sold the crop at the railroad by e linear foot. That is the method he used in market- g the cotton he delivered at the gin or the potatoes sacked and hauled to the railroad.

* * *

Porcupines of the southwestern national forests ve betrayed themselves as followers of the beaten ack, and Federal biologists are plotting against them uch more hopefully than in the past. E. E. Horn, the Bureau of Biological Survey, has observed that their migrations between the lowlands and the ountain peaks these animals follow rather definite utes one season after another. The path of migra- on, it appears, is usually about a mile wide. Exami- ation of trees baited by Mr. Horn with salt and rychnine revealed one or more dead porcupines under ore than half of the baited trees.

Infestation with porcupines has become serious on ortions of the Tusayan, Coconino, Carson, and San uan National Forests.

Use of Local Supplies Saves Costs and Timber

Each of the seven timber-treating plants operated by the American Forest Products Co. throughout the eastern part of the United States draws its supplies of poles, as fully as possible, from the territory immediately surrounding it. For example, the large plant at Yarmouth Junction, Me., treats only eastern white cedar poles, most of which come from eastern Canada and northern Maine. W. F. Bancker, president of the company, besides practicing this policy, is calling the attention of other wood-treating agencies to the extravagance of bringing timber supplies from afar when local supplies are available. He points out to them, also, that besides effecting business economies his plan works against the waste of forest resources, by reducing the cost of cutting and handling, permitting better utilization of by-products, and bringing about better regulation of production within each timber-producing zone.

* * *

"Everybody helped" this spring when the fourth district, Minnesota Federation of Women's Clubs, started a community forest on Lake Keller, just north of St. Paul. The Ramsey County commissioners provided the land; the Cloquet Forest Experiment Station furnished the trees; forestry students of the University of Minnesota did the planting; and the St. Paul Pioneer Press and Dispatch, besides giving generous publicity to the undertaking, served refreshments to the planting crew.

* * *

The three-year period from January, 1924, to January, 1927, saw 30 lumber mills cut out in Louisiana, Texas, and Arkansas, according to the Gulf Coast Lumberman. The count was: Louisiana, 18; Texas, 10; and Arkansas, 2. The total daily capacity of the 30 mills was reported as 3,950,000 board feet.

* * *

A walnut tree growing on the farm of G. W. Gerwig, in Braxton County, W. Va., in the 10 years since it began to bear has produced $150 worth of nuts. Mr. Gerwig recalls that when he started farming for himself, 37 years ago, this tree was bent almost to the ground by the weight of a small pig hung on it at butchering time. To-day it has a diameter of more than 2 feet.

* * *

The reopening of the case in which the Federal Trade Commission ruled against the use in trade of the term "Philippine mahogany" resulted in the board's sustaining its original findings.

* * *

More than 1,000,000 linear feet of pine piling was used in closing the Caernarvon gap in the levee below New Orleans.

Foreign Notes

Forests, Snow, and Floods in Belgium

(From a report of the special commission of the superior forest council, published in the Bulletin of the Central Forestry Society of Belgium.)

The influence of the forest is especially manifest and important at the time of the melting of the snows. The big floods have always occurred in winter (for example, that of 1880 occurred in December and that of 1925–26 in December and January), at the moment when the summits of our highest hills and plateaus were covered with an abundance of snow. It is the sudden melting of a great quantity of snow that generally is the determining factor in floods, and this sudden melting takes place on areas without vegetative cover when the temperature rises or when a hard rain, however short in duration, occurs.

Under the cover of the forest the sun and the rain do not fall directly on the snow, especially in coniferous forests which retain their foliage during the winter. The temperature remains lower and rises less quickly. The rain does not fall directly nor so abundantly on the ground. And the snow melts slowly. It is not unusual to see snow in a thick layer in the forest some weeks after it has disappeared from the neighboring open country.

A special condition exists in Belgium. On our high plateaus there are marshy spots that have been denuded on too large a scale. Often at the beginning of winter these marshy areas are covered with water as a result of the fall rains. When a freeze comes ice covers the whole surface. If snow falls it accumulates on this smooth surface, which greatly facilitates the flow of water when rapid melting takes place. One then sees extremely sudden floods in the streamlets that rise in the marsh country, while in the neighboring forest, often composed of spruce stands, nothing of the kind takes place. It may be added that the most rain and the most snow fall at the highest elevations.

Influence of Snow on Run-off

Snow in the high mountains has the power of holding back 65.5 per cent of its own volume in rain water or melted-snow water before allowing the water to flow. This property of snow is a powerful factor in influencing run-off; the heavier the snowfall in winter the later the flood period in the spring. This conclusion is the result of a study of conditions in the valley of the Viège de Saas by a Swiss engineer, O. Lütschg, and is reported in a recent publication entitled "Ueber Niederschlag und Abfluss in Hochgebirge."

French Societies Celebrate Tree Day o November 11

The National Wood Industries Association and Society of the Friends of the Trees, with the c currence of the Minister of Public Instruction, h fixed on Armistice Day as the date of an annual tr planting festival in France. The societies have s gested that each commune fix upon some fores activity that it can at least begin on that day—plant a few trees on the roadsides or on communal la establishing forest tree nurseries in the schools, reforesting denuded and unproductive areas.

In outlining the plan the officials of the two societ write:

"We believe that if, in a great many communes France, the 11th of November were marked by ceremony in the course of which the school child planted a few memorial trees * * * it would sh through a clear and striking symbolism the desire the young people to continue the work of preced generations, their wish to enrich and beautify the la which their fathers fought to protect, and their const faith in the future of our nation."

Portugal's New Law

By a decree of May 20 (1927) it is forbidden to duce the area of Portuguese forests unless a manif advantage is to be gained by changing from for culture to agriculture or by replacing one species w another. Clearings of certain species must be planted within two years. No cutting can be d without a previous declaration of intention. By t law it is also forbidden to remove cork from trees less than 9 years' growth. Buyers of cork trees m declare to the department of forests and waters all purchases which they have made of cork trees where the trees are, when the cutting is to be ma or when the weighing will take place. Penalties of to 50 per cent of the value of the material are p vided for failing to comply with the law.

It is forbidden to destroy, without authorizati trees bordering streams which serve to fix the soil protect it against erosion.

* * *

The French rosin trade has officially adopted color value and nomenclature of the United Sta rosin standards from B to WW, inclusive. The Uni States standard for X, the highest grade recogni in the American trade, apparently did not suit the ne of the French trade, which has a larger market extra pale rosins.

tate Forests and Forest Nurseries in Palestine

In 1926 Palestine had 120 State forests, with an ggregate area of about half a million acres, and mainined 14 forest nurseries. From the Government urseries 245,000 trees were furnished to Government antations and 32,000 to public organizations and hools, and 84,000 were sold. Nurseries were mainined at Acre and Jebalia to produce plants for sand xation. The objects of Government afforestation ork were planting of waste lands, reclamation of sand unes, and improvement of forest reserves.

Australian Forestry School

The Australian Forestry School, which was opened t Canberra on April 11, 1927, began its work with tudents enrolled from every State in the Commonealth and with a staff of three lecturers. The principal is C. E. Lane-Poole, inspector-general of forests, nd the faculty is made up of C. E. Carter, M. F., ale; H. R. Gray, Dip. For., Oxford; A. Rule, M. A., . Sc., Aberdeen University; and G. W. Nunn, sureyor.

The school building is in itself a demonstration of he utilization of native woods. It is "constructed rom floor to rafters with Australian woods, paneled nd furnished with Australian woods." It contains ecture rooms, a museum, library, laboratory, drafting oom, and offices and service rooms. An arboretum nd forest nursery and plantations provide excellent acilities for field study. Arrangements have been made for the study of forest management and the preparation of management plans through cooperation with the chief forester of the Federal Capital Commission, and preliminary work has already started on a near-by forest of Eucalyptus.

Two years of university work are required for entrance to the forestry school.

Australians Plan Paper Making from Eucalyptus

Australians have watched with interest the experiments of the United States Forest Products Laboratory leading to the development of a process by which newsprint paper can be produced from hardwoods, according to a writer quoted in the Australian Forestry Journal. Early this summer the Tasmanian Parliament had already granted concessions over about 175,000 acres of land in southern Tasmania to the Tasmanian Paper Proprietary (Ltd.), and this company was constructing a mill near Geeveston for the manufacture of paper from Eucalyptus. Another company was being formed for the purpose of establishing a similar industry in northwestern Tasmania on a large area of Crown land, concessions over which had been granted to Gerald Mussen, of Melbourne.

The French Believe in Fire Suppression

An incident suggesting the Frenchman's idea of the value of forests to the public is related by J. C. Nash, president of the Columbia Naval Stores Co. One hot day while Mr. Nash was traveling through the Landes district, in southeastern France, his train entered a woods where a fire was spreading rapidly and threatening considerable damage. The train was stopped at once, and the train crew and all the passengers alighted and fell to work fighting the flames. Only when the fire was out did the train proceed. So far as Mr. Nash learned, no one on the train had any money invested in the woods that were burning.

By Cable to the Lookout Platform

A British Columbia logging company, McCoy-Wilson (Ltd.), of Reed Bay, has put its fire lookout on top of a 160-foot Douglas fir and rigged up an ingenious device for getting the observer to his perch. An endless cable runs through a block at the top of the tree. Attached to the cable is a seat, and opposite the seat a counterweight just a few pounds lighter than the observer. A cable is stretched tight from the tree top to the ground and within reach of the observer, who pulls himself up by it. Coming down is a joy ride, for the man's slight advantage in weight takes him down automatically. The observer wears a heavy belt attached to a safety device which prevents sliding down unless a spring lever is held continually in the hand.

The lookout has a view of the company's entire timber holdings and of the logging operation. A telephone and a map divided into 10-acre squares provide means for giving quick and definite notice of fires. The lookout is supplemented by foot and speeder patrolmen.

Compulsory Fire Protection in France

Bois et Resineux, August 7, 1927, carries an account of a fire protection association formed at Cabanac, a commune south of Bordeaux, France. All the proprietors of the district are compelled by a French law ("the law of 1865") to take part. This law provides that if more than half the proprietors representing two-thirds of the area in the commune, or two-thirds of the proprietors representing half the area, form such an association all other proprietors are obligated to take part in providing pumps and other equipment and doing the necessary work.

* * *

The first paper mill in the Prairie Provinces of Canada has been established by the Manitoba Paper Co. at Pine Falls, Manitoba, on the south bank of the Winnipeg River, about 70 miles northeast of Winnipeg.

Personals

William S. Taber has been appointed State forester of Delaware. Mr. Taber is a graduate of the Pennsylvania State Forest School and was formerly a member of the Pennsylvania forestry organization.

Dr. H. B. Kummel, State geologist of New Jersey, has been reappointed director of the State's department of conservation and development. H. F. McConnell, of Upper Montclair, has been reelected president of the State board of conservation and development.

Clark C. Heritage has been placed in charge of the pulp and paper investigations of the Forest Products Laboratory, succeeding J. D. Rue. Mr. Heritage has had long experience in research and industrial work as a chemical engineer.

John S. Boyce is to succeed Samuel T. Dana as director of the Northeastern Forest Experiment Station, Amherst, Mass. Doctor Boyce returns to the United States Forest Service after a long period of specialization in forest pathology, during which he has come to be a recognized authority in that field. He has for eight years headed the Portland, Oreg., office of forest pathology, Bureau of Plant Industry. His publications include important studies on dry rot of incense cedar, decays and discolorations in airplane wood, and decay in Douglas fir in the Pacific Northwest. Until Doctor Boyce's transfer early in 1928, M. Westveld, associate silviculturist of the Northeastern Forest Experiment Station, will act as director.

Alvin G. Whitney is leaving his post as assistant director of the Roosevelt Wild Life Forest Experiment Station of the New York State College of Forestry to become professor of zoology at the School of Forestry and Conservation, University of Michigan.

Walter C. Lowdermilk, recently professor of forestry at the University of Nanking, China, in recognition of his erosion studies in the Orient has been made a fellow of the Royal Geographic Society. Mr. Lowdermilk spent the past summer making erosion and stream-flow studies with the California Forest Experiment Station, and is now registered at the University of California as a candidate for the Ph. D. degree in forestry. His thesis will deal with forest cover types as a factor in erosion.

W. D. Humiston has resigned as a member of the Idaho State Cooperative Board of Forestry, of which he was secretary and treasurer.

F. E. Garlough, of the division of economic invest gations, Bureau of Biological Survey, who has bee in charge of field eradication methods in Californi has been assigned as assistant biologist to work i cooperation with the California Forest Experimen Station.

Phillips A. Hayward has resigned as instructor i wood utilization, New York State College of Forestr to join the staff of the National Committee on Woc Utilization.

Arthur T. Upson, standards engineer and woc technologist of the National Lumber Manufacture Association, has been promoted to the directorship the eastern division of the association's lumber trac extension department, with headquarters in New Yor City. He will continue to serve as secretary of tl central committee and will still have charge of tl association's standardization work. Before joinir the staff of the association in 1924 Mr. Upson was fo 14 years a member of the United States Forest Servic his final post in the Federal service being that of chi of the section of industrial investigations of the Fore Product Laboratory.

Raymond H. Torrey, field secretary of the Nation Conference on State Parks, has been made secretar of the American Scenic and Historic Preservatic Society. Dr. Edward Hagaman Hall, whom l succeeds, resigned to become secretary of the Municip Fine Arts Commission of New York.

H. L. Person, assistant entomologist at the Fore Insect Field Laboratory, Palo Alto, Calif., has recent been assigned by the Bureau of Entomology to tl California Forest Experiment Station.

Prof. John Bentley, of the forestry department Cornell University, sailed October 1 for Japan, whe he will spend several months in the study of forest conditions.

Uno. W. Lehtinen, a member of the State fore service of Finland, recently left the United States aft spending nearly three years here and in Canada as student of forestry and of forest products researc methods. During the school year 1925–26 M Lehtinen was a forestry student at Yale. Later l visited Canadian pulp mills and sawmills and studie the lumber market in New York City. During tl past spring and summer he studied forest produc utilization at Syracuse University and research metho at the Forest Products Laboratory.

Thomas J. Mosley has resigned as technical reviewer the Forest Products Laboratory to accept a position the extension division, University of Wisconsin.

O. J. Murie, associate biologist of the Bureau of iological Survey, has been detailed to make a study the elk problem in the Jackson Hole country, in Wyoming.

C. W. Watson has left his position as assistant rofessor of silviculture in the School of Forestry of the niversity of Idaho to enroll in Yale University as a andidate for the Ph. D. degree.

Ivan H. Sims, of the Appalachian Forest Experiment Station, R. E. McArdle, of the Pacific Northwest orest Experiment Station, and Robert K. Winters, f the Whitman National Forest, are taking a year's ave of absence for graduate work in the School of orestry and Conservation, University of Michigan. While attending the school all three are serving as unior instructors.

Dr. R. R. Staples, in charge of range investigations t the Government agricultural experiment station at edara, Natal, South Africa, toured the United States his summer.

Galen W. Pike, forest ranger on the Colorado National Forest, is spending a year's leave of absence n study at the Yale Forest School.

John E. Aughanbaugh has been appointed to the faculty of the Pennsylvania State Forest School as a substitute for Prof. W. H. Horning, who is taking a year's leave of absence.

Tom O. Bradley has been appointed superintendent of the Mont Alto State Forest and of the State forest nursery at Mont Alto, Pa.

S. V. Fullaway has resigned as chief of the office of forest products, Northern National Forest District, to join the staff of the National Lumber Manufacturers Association. He has been given charge of the Portland, Oreg., office of the association's trade extension department. Mr. Fullaway's former post in the Federal service has been filled by the promotion of Melvin I. Bradner, who has been connected with the forest products office of the northern district since 1923 as specialist in economic investigations.

George M. Turner has been appointed district forester for the southern part of Connecticut.

S. R. Gevorkiantz, junior forester with the Lake States Forest Experiment Station, has gone on leave of absence for a year to take advantage of a Harvard Forest scholarship.

Correction: Louis J. Pessin in leaving the Federal service returned to Texas as plant pathologist at the Texas Agricultural Experiment Station, not as a member of the faculty of the Texas Agricultural College as was reported in the Forest Worker of July, 1927.

Bibliography

A Belgian Book on Silviculture

By E. N. Munns, United States Forest Service

One of the few forestry books of major importance that have appeared since the war is the "Manual of Silviculture" of A. Poskin, director of the forest experiment station at Gembloux, Belgium. (A. Poskin: Traité de Sylviculture. Bibliotheque Agronomique Belge. 438 pp. 175 fig. Gembloux, 1926.) Incidentally, this is the first work of consequence dealing entirely with Belgian silviculture. Professor Poskin's book in general covers for the silviculture of Belgium very much the same ground as Joylet's does for that of France, but is superior to the French work in that it is far more complete and is more specific in dealing with individual species and with local conditions.

The manual opens with a description of species, giving dendrological and silvical characteristics of both native and foreign trees. The importance in Belgium of roadside, park, and city planting has led to the inclusion of some species chiefly valuable in arboriculture. Of the foreign tree species described a considerable number are American.

Professor Poskin stresses the value of the mixed forest both from the standpoint of growth and from that of soil improvement, and indicates that under most conditions the mixed stand is economically desirable. He gives an exceedingly full account of numerous cutting methods, pointing out the advantages and disadvantages of each. The silviculture of the important species is carefully outlined and the complete management cycle is indicated for stands from which certain products are desired. In connection with a detailed description of the various elements of nursery and planting practice considerable stress is laid on the importance of procuring seed of good quality and known origin.

Many unusual difficulties of land reclamation and reforestation in Belgium are brought out. For example, in the lowlands drainage ditches are necessary; some forest soils can be made mellow only by cultivation as intense as that practiced on agricultural land; and some are so impoverished that they require fertilization by chemicals or even by the raising of legumes and by inoculation with nitrifying bacteria.

Although not confronted with a fire problem such as ours, the Belgians realize the importance of fire protection and have developed a system of lookouts and fire-line construction much like that used in America. One learns with some surprise that caterpillar logging, which is just now coming to be an exceedingly important logging method in this country, has been developed also in Belgium, and that the transportation of logs to the mill by truck is an accepted practice there.

Of the numerous illustrations contained in the book many are poorly reproduced. A disappointingly large amount of space is given to photographs that, like many of those taken for similar purposes by American foresters, fail to show clearly the points the author wants to bring out.

A New Bulletin from Pennsylvania

By C. R. Tillotson, United States Forest Service

A bulletin based on extensive local experience and designed for local use is usually authoritative and to the point. That is the case in respect to the recent Bulletin No. 44 of the Pennsylvania Department of Forests and Waters, "Forest Tree Nursery Practice," by J. W. Keller. This bulletin describes the methods and practices that have been found most satisfactory in the production of about 15,000,000 trees a year in the State-owned nurseries of Pennsylvania. It is well worth reading, and is so brief that it can be read in a half hour.

It is not to be expected that nurserymen in other States will subscribe entirely to some of the methods in use in Pennsylvania nurseries, such as using red lead on seed before it is sown, mulching the beds with leaves, pine needles, or straw, and combating seed-eating birds by employing small boys rather than by using screens. They will probably benefit materially, however, from the discussion of methods employed in Pennsylvania to combat diseases and insects, and they can probably employ to advantage in their own nurseries some of the mechanical devices that have been or are being developed at the Pennsylvania nurseries.

Shortleaf Pine Primer

Shortleaf pine is recommended as a desirable and profitable farm crop in Farmers' Bulletin No. 1534, "Shortleaf Pine Primer," on the basis that it "grows rapidly, produces high quality, soft-textured wood, and easily perpetuates itself by means of an abundance of seed, and also, if the young pines are killed back, by sprouting up vigorously from the ground." A map shows the natural range of the species and the region where it grows best, and a table tells what rate of growth may be expected of it at different ages on go land, on average land, and on poor land. The farn is advised to cut and market his own timber and given careful and detailed instructions as to how estimate the volume of his standing timber and sc his logs. Directions for thinning are accompanied wi drawings showing how trees should be chosen for moval. Each step in the raising of shortleaf pine see lings in nursery beds is explained, beginning with t construction of the beds themselves. The right w to plant the seedlings, with mattock and with dibble, made clear not only by verbal directions but by eig line drawings. The conclusion discusses the protecti of the growing crop from fire and from animals a insect enemies.

The booklet is well illustrated with photograp taken by the author, W. R. Mattoon.

A Form for Computing Tree Measuremen

About two-thirds of the labor of computing tr volumes for the purpose of preparing volume tables eliminated through the use of a new form develop by Lester H. Reineke for the United States For Service. This form, Tree Measurements Form 55 consists primarily in a specially designed graph pap on which the tree measurements are plotted as th are taken in the field. A curve drawn through the points shows the form of the entire tree stem, and volu in cubic feet can be accurately determined by measuri the area under the curve with a planimeter. Volu in board feet can be quickly read from a transpare scale placed over the graph.

The use of this form will result in a saving of ti not only in computing volumes but also in field wo since measurements need not be taken at standa intervals along the stem but can be taken at the e of each log as it is cut. Each sheet becomes a comple field and office record for the tree.

Form 558a is now available to the public by purcha from the Superintendent of Documents, Governme Printing Office, Washington, D. C., at the rate of per 100 copies and $7 per 1,000 copies.

Forest Economics for Oregon Schools

An outline of the "Economics of Forestry" has be prepared by the Portland, Oreg., office of the Unit States Forest Service for use in the high schools Oregon. Special care has been taken to localize t treatment of the subject and to explain the organiz tion and aims of the different forestry agencies. T outline is a revision of one, prepared last year at t request of an Oregon high-school principal, that w submitted for criticism to several cooperating agenci and was then tried out in two high schools. In i present form, which occupies 30 mimeographed pag it has been sent out to each high school in Oregon.

A Pamphlet on French Turpentining Methods

Austin Cary's series of articles on French turpening methods, which appeared recently in the Naval res Review, is being reprinted in a pamphlet itled "My Trip to France." Copies may be obned for 30 cents each by addressing Austin Cary, 0 F Street, Washington, D. C.

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FOREST WORKER

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Announcements

Hearings on McSweeney Bill

Hearings on the bill for an adequate Federal program of forest research introduced in the House of Representatives by Congressman McSweeney (H. R. 6091) are expected to be held by the House Committee on Agriculture the last week in February or the first week in March.

American Forest Week

American Forest Week of 1928 will be observed April 22–28. The American Forest Week Committee this year is headed by Theodore Roosevelt as chairman, and has as the chairman of its executive committee Ovid M. Butler, secretary of the American Forestry Association.

Southern Forestry Congress

The Tenth Southern Forestry Congress will be held in Louisville, Ky., February 14 and 15, 1928.

Haiti Wants a Forester

The director general of the technical service of the Department of Agriculture, Republic of Haiti, has asked the Chief of the United States Forest Service to recommend men suitable for appointment as director of forestry of Haiti. It is expected that the position will be open within the next six or seven months. A forestry appropriation of $35,000 for the current year permits the offer of a salary of $5,500. Requirements are stated by the director general as follows: "While we should prefer to have a man experienced in tropical botany and forestry, these are not of primary importance, because a man well grounded in botany will make himself acquainted with our forest trees in a comparatively short time. It is more important th he be well trained and experienced in the organizat of national forests and in the administration of th organizations, and that if possible he be able to spe French."

It is desired to have the new man on the grou for a considerable period before he takes over the wo Foresters who wish to be considered for the posit should communicate as soon as possible with Forester, United States Forest Service, Washingt D. C.

Meeting to Revive the Internation Union of Forest Experiment Station

The international congress contemplated for purpose of reviving the International Union of For Experiment Stations is now being planned for summer of 1929. The Swedish Government has b asked by the board of the national college of fores and the State Institute for Forest Research to app priate 26,000 crowns to cover the expenses of the me ing. It is intended that the members of the congr should meet in Malmö and spend a week in excursi to experimental forest grounds of southern and cent Sweden. Another week or less would be devoted the congress, in Stockholm, probably at the coll of forestry. A trip through northern Sweden to v experimental forests and other forest grounds th would be arranged for delegates wishing it. attendance of about 100 is expected.

National Four-H Camp

A second national camp of Four-H Club boys a girls will be held in Washington, D. C., in June, 19 under the auspices of the Department of Agricult

Because the free edition of this periodical is necessarily limited, it can be distributed without charge outside of the Government service only to such persons and organizations as State forestry and conserva- tion officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Print ing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

Material offered for publication in the Forest Worker should be addressed to the Editor, United States Forest Service, Washington, D. C.

FOREST WORKER

ashington, D. C. JANUARY, 1928 Vol. 4, No. 1

State Forestry

urchases of Forest Land by New York State

Purchase of 6,035 acres of high mountain land in sex County, N. Y., for addition to the Adirondack est preserve, was recently approved by the board of mmissioners of the State land office. The land is uated southeast of Mt. Marcy and on the Elk Lake tershed, intermingled with lands already owned by e State. The greater part of it lies on the upper pes of nine mountains, Marcy, Skylight, Redfield, len, Grey Peak, Cliff, Dix, Macomb, and Marshall, of which are more than 4,000 feet in height. When is purchase has been completed the State will own all e slopes of these mountains, with the exception of a ivate park on Dix. The area includes Lake Tear-of-e-Clouds, the major portions of Feldspar and Uphill ooks, and other upper sources of the Opalescent, usable, and Hudson Rivers. A considerable portion it is forested with a heavy stand of virgin softwood nber which the owners were planning to cut in the immediate future. Important watershed protection and creational values are thus involved in this purchase ich, since it will round out present State holdings, desirable also for administrative reasons.

The addition of 41,243 acres to the State forest eserves of New York during the year 1927 has ought their total area to 2,078,994 acres. The year's rchases exhausted the remainder of the funds from e $7,500,000 bond issue made available by the ferendum of 1916. The conservation department ports that these funds were expended as follows:

rchase of land (293,822.05 acres)	$6,524,162.60
rchase of underlying titles to 41,140 acres	250,400.00
penses of department of law	380,836.95
penses of conservation department	324,791.31
penses of comptroller's office (printing bonds, etc.)	19,808.94
	7,500,000.00

* * *

The village of Warsaw, N. Y., has purchased a tract 40 acres as an addition to the municipal forest on hich in the past four years it has planted 115,500 ees.

Los Angeles Plants Trees on Burned-over Watersheds

Los Angeles County, Calif., has done another big year's work for the improvement of its burned-over watersheds. In the 12 months ending June 30, 1927, the county planted on the watersheds 72,719 trees raised in its own nurseries, and sowed on them 1,935 pounds of clean tree seed and 7,210 pounds of clean brush seed. In addition it furnished 50,000 Coulter pine seedlings to be planted by the California Forest Experiment Station in the Devil's Canyon nursery, near San Bernardino, and eventually to be used in watershed reforestation. Under a new ruling of the county board of supervisors 15,075 2-year-old Coulter pines were distributed without charge to private individuals and organizations for planting within major watershed areas of the county.

Nearly 2,000 trees were used by the county foresters during 1927 in roadside planting.

Trees raised by the county may now be sold at 1 cent apiece for planting outside the county, or for planting within the county on private lands not included in major watersheds. Under this provision 35,850 trees were sold during the year, all but 2,200 of them for use outside the county.

Seedlings and transplants that were growing in the county nurseries, at Altadena and Grizzley Flats, during the year included 679,948 conifers, of which 531,061 were Coulter pine and 103,324 were big cone spruce, and 16,055 hardwoods.

Early in the year the county entered on an agreement with the Federal Government for cooperation in the work of the newly established California Forest Experiment Station. The county foresters are now cooperating with those of the station in a study of methods of establishing a cover on denuded watersheds, and in a study of erosion at the Devil's Canyon branch station.

Los Angeles County has appropriated about $1,250,000 for the work of the county forestry department during the present fiscal year, of which amount about $396,000 is available for fire prevention and suppression in brush and timbered areas.

Fire Protection District Created in Mississippi

The 18-months-old Mississippi Forestry Department has already created a forest fire protection district embracing 500,000 acres of cut-over land. The district lies in the southeastern part of the State, west of the Pascagoula River. The forest type is longleaf and slash pine. In the past, fires have burned over something like 80 per cent of this area every year. Under the present plan the owners pay 3 cents per acre annually for fire protection and the State, with Federal funds allotted under the Clarke-McNary law, is putting up 2 cents per acre per year. District Forester K. E. Kimball is in charge.

The plan calls for five, or perhaps six, steel observation towers. One tower was erected on the area several years ago by the Southern Paper Co., and a new steel tower, 90 feet high, has been completed recently. Thirty-seven miles of telephone line have been completed.

New Michigan Park Contains Virgin White Pine

The sixtieth and largest of Michigan's State parks has been presented by Mrs. Karen Hartwick, of Ann Arbor, as a memorial to her husband, Edward E. Hartwick, and her father, Nels Michelson. It is an 8,236-acre tract near Grayling, Mich., including 85 acres of virgin white pine said to be the only stand of this timber left in the lower peninsula. It will be known as the Edward E. Hartwick Pines Park. The State will reforest the cut-over portions and will build a lodge in which to exhibit relics of the old lumbering days. The Sallin Hansom Co. sold the tract to Mrs. Hartwick for $50,000.

* * *

A bill (H. R. 42) introduced in the House of Representatives on December 5 by Mr. Free would amend section 4 of the Clarke-McNary law so as to permit cooperation with States in growing forest trees and distributing them to all classes of landowners, instead of to farmers only as under the present provision. A companion bill has been introduced in the Senate by Senator Oddie.

* * *

The part of the Clarke-McNary cooperative work of the Federal Government with Southern States that was heretofore handled by the district forester of the eastern national forest district has been transferred to the branch of public relations in the office of the Forester in Washington. The States affected by this change are Virginia, West Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, and Florida. The change became effective December 1.

Some Notes from Louisiana State Nursery

In the Louisiana State Forest Nursery, near Al andria, La., seed of longleaf pine were sown this as soon as possible after extraction. It has b observed that seedlings from fall sowings are m resistant to the red-spot fungus than those from s sown in the spring. The longleaf stock from spring sowings of 1926 and 1927 became badly infec with the red spot, so that by the middle of Octo most of the leaves were dead. A new growth of lea in November, however, gave a full green color to the beds. It is the opinion of Henry Hardtner, Urania, and L. I. Barrett, of the Southern Fo Experiment Station, that longleaf seedlings will sust repeated yearly attacks of the red spot without m loss by death.

The tip moth, which played havoc in 1927 w loblolly and shortleaf pine in many parts of the So including central Georgia, only slightly attacked seedlings in the Louisiana nursery beds.

Experimental plantings have been made by C. Delaney, State forest custodian in charge of the n sery, with seeds of certain longleaf trees that prod very large cones bearing seeds with small light-bro wings instead of the large dark-brown wings. Th trees, Mr. Delaney has observed, produce wood wit relatively uniform soft texture, or with very nar bands of summer wood. Another strain now be tested is the hybrid of longleaf and loblolly known the Sonderegger pine, which is said to resemble longleaf in appearance during youth but to grow a much more rapid rate.

Among the hardwoods sown in the Louisiana nurs this fall are white and green ash, white oak, and bl walnut. Next spring a large sowing of short loblolly, and slash pine will be made, as well as sma sowings of cypress, catalpa, and black locust.

In the season of 1927 cypress in this nursery grew an average height of about 3½ feet and to a maxim of 5 feet.

Sulphuric Acid to Keep Out the Wee

Sulphuric acid as a preventive of the growth of we has been used successfully by F. H. Claridge in State forest nursery at the North Carolina St Agricultural College, Raleigh, N. C. Mr. Clari used three-sixteenths ounce of commercial sulph acid (57 per cent), diluted with 1 pint of water, each square foot of nursery bed. The seed, pri pally of loblolly, longleaf, shortleaf, and slash pi were placed in the seed beds and covered lightly w sand, and the diluted acid was applied immediat by means of a watering can.

Railroad Fires Decrease in New York

Smokers' fires made up 38 per cent of the 868 forest es recorded in New York State in 1927, and covered per cent of the area burned, Conservation Commisoner McDonald reports. Railroads were responsible r 14 per cent of the fires and for 20 per cent of the area rned. Brush burning caused 7 per cent of the fires, d fishermen and land-clearing fires about 6 per cent ch. The fact that the number of fires caused by ilroads decreased, at the same time that fires from her important causes showed increases, is credited to oser inspection of locomotives and improved maintence in all fire-protective devices on locomotives.

Nebraska Homestead Plantation Becomes a State Park

A piece of a Nebraska homestead that was planted ith trees 65 years ago has been dedicated as the Stolley tate Park. It was in 1857 that William Stolley igrated from the East to settle on this land. Mr. tolley had learned forestry in Germany, and he lost time in starting a forest plantation. He set out 000 trees in 1861, and continued until he had planted acres. On a second tract of 20 acres he developed sort of arboretum, with forest and ornamental trees f many species. The portion of the homestead ntaining these trees has been purchased at a cost of bout $30,000 with funds raised through the activities f the Grand Island Chamber of Commerce, and was eeded to the State in October, 1927, as the fourth nit in Nebraska's system of State parks.

Lookout Towers for North Carolina Forests

With 10,000,000 acres of forest land under organized rotection, the State of North Carolina plans a system f 55 lookout towers. Eight towers and two mountain ops were manned this fall by the State forestry division n cooperation with counties and individuals and, in the ase of the stone tower on Mount Mitchell, with the ederal Government. Those in use for the first time vere a 60-foot steel tower on Palestine Hill, 10 miles orth of Fayetteville, in Cumberland County, and a 5-foot steel tower on Hibriten Mountain near Lenoir, n Caldwell County. A new 30-foot steel tower on ightop Mountain, near Asheville, will be manned in he near future, and three wooden towers are under contruction this winter.

❧

Farmers of west Tennessee have made arrangements o plant 100,000 black locust seedlings on waste and ullied lands this coming spring. The seedlings will e furnished by the State forestry division, which is irecting the reclamation effort.

Sportsmen's Reforestation Cup Awarded

The silver reforestation cup given to the sportsmen's clubs of New York State by James S. Whipple, formerly commissioner of the State conservation commission, was awarded for 1927 to the Shawangunk Fish and Game Association of Orange and Sullivan Counties. During the past year this club was responsible for the planting of 603,000 trees. The closest contenders were the Cortland County Sportsmen's Association, with a score of 406,000 trees, and the Orange Lake Fish and Game Association, Newburg, with 46,000. Four other clubs had to their credit the planting of from 6,000 to 20,000 trees.

❧

The supervisors of Erie County, N. Y., have voted an appropriation of $55,000 for purchasing and reforesting idle farm lands. Of this sum $15,000 will be available in 1928 and $10,000 in each of the four succeeding years. Trees for planting will be furnished without charge by the State.

❧

The Wisconsin Conservation Commission has announced that the State forest nursery is to be enlarged at once to twice its present capacity. The board also plans to bring the nursery's capacity to 10,000,000 plants within the next three years and to 20,000,000 within the next five years.

Applications for registration of land under the State forest crop act received by the commission up to November 28 represent about 100,000 acres.

❧

The Hearthstone Point camp site, on the west shore of Lake George, which the New York Conservation Commission opened to the public in 1927, is to be enlarged through the purchase of a 35-acre tract adjoining it on the north. This will add 800 feet to the camp ground's frontage on the lake and also on both sides of the Lake George-Bolton highway. An elaborate system of roads constructed by a former owner minimizes the expense of preparing the area for the use of campers.

❧

Additions by purchase to the State forests of New Jersey during the fiscal year 1927 totaled 2,019 acres. The sum of $111,496 is available for forest acquisition by the State during the present fiscal year.

❧

A five-minute talk dealing with the forest resources of Virginia will be broadcast from radio station WRVA, Richmond, Va., at 8 p. m. on the last Thursday of every month during the winter and spring. The State forester and members of his staff will speak.

Education and Extension

New Four-Year Forestry Course at Utah College

A four-year course in forestry is being started by the school of agriculture of the Utah Agricultural College at the beginning of this year's winter quarter. The course offers opportunity for specializing in range management in the senior year. Provision is made for a six weeks' summer camp between the sophomore and junior years.

Yale to Get African, Nicaraguan, and Peruvian Wood Specimens

Specimens of African forest species are to be added to the Yale Forest School collection of tropical woods, which now includes more than 11,000 specimens. The Firestone Plantations Co. has agreed to collect them for the school in the areas it is clearing for rubber cultivation in Liberia. Additions to the collection from tropical America are expected to result from arrangements that have been completed with lumber companies in Nicaragua and Peru. Collectors for the school are still at work in Honduras, Guatemala, and British Honduras. One of their recent discoveries identifies the Honduras rosewood, used in this country for the bars of xylophones and marimbas, as a species of Dalbergia. In honor of Neil S. Stevenson, assistant conservator of forests of British Honduras, Dr. Paul C. Standley has given the tree the name Dalbergia Stevensonii.

Yale Offers Ph. D. in Forestry

Yale University has announced that in future it will offer the degree of doctor of philosophy in forestry. Until the present time foresters desiring to obtain the doctor's degree from Yale have been registered in the department of botany in the graduate school, even if their work was almost entirely under the faculty of the school of forestry.

In the present school year six foresters are enrolled in Yale as candidates for the doctor's degree.

* * *

A course in the principles of forest entomology is now required of students of forestry and logging engineering in the Oregon Agricultural College. In addition to this introductory course the school offers three regular elective courses in forest entomology and other work in forest insect problems.

Washington De Molays Establish For Plantation

Boys of the Order of De Molay in the State of Wa
ington have just made themselves members of the w
order of tree planters. The 33 chapters in the St
have joined in providing funds for the establishm
of a forest plantation on the Columbia Natio
Forest, and the first planting of 57,000 Douglas
trees went into the ground this fall. The site
about 15 miles north of Carson, Wash., on the E
green Highway. This planting, which is to be
peated on adjoining land in succeeding years, re
sents the "special patriotic and civic service" of
State organization for 1927, and the boys look forw
to the time when De Molays of both Washington
Oregon will find the Washington De Molay Fores
ideal camp ground.

The cut-over area thus to be reforested was sele
by J. F. Kümmel, chief of planting of the North Pa
National Forest District. The trees were brought f
the Wind River Forest Nursery, and the actual pl
ing was done by a crew of 12 experienced men u
the direction of G. A. Bright, technical assistan
the Columbia National Forest. The expense to
De Molays was $769.

Louisiana Puts Forestry in Boy Sc Camps

The Louisiana Division of Forestry had represe
tives at practically all the Boy Scout camps of
State in the past summer. At Camp Salmen,
Slidell, about 500 scouts got a taste of forestry d
visits of two weeks or more. W. B. Wheelis, a for
graduate of the Louisiana State University, was
teacher at this camp. Forestry talks and hikes
supplemented with visits to the operations of
Great Southern Lumber Co. and to turpentine orch
The boys practiced what they had learned of the
of woodlands in improving a plot of loblolly and
pine, and before leaving camp nearly every scout
an emblem by identifying 10 trees and naming
uses.

* * *

Four-H Forestry Clubs of North Dakota are l
ing to identify trees in winter, through instruc
prepared for them by Extension Forester Gillett.
the native and many introduced species are cover
Mr. Gillett's instructions, which include diagram
a key.

Arnold Arboretum Endowment Fund

bout $600,000 has been raised toward the $1,000,000 lowment fund for the Arnold Arboretum of Harvard iversity, projected as a memorial to Charles Sprague gent, late director of the arboretum. On Decem- 3, $109,250 had been received from New York ntributors. Edward S. Harkness has offered a gift $50,000 on condition that the New York committee tch the $460,000 already contributed in Boston.

Purdue Summer Forestry Camp

The forestry department recently organized in rdue University, LaFayette, Ind., will hold its first estry camp during the coming summer on the 5,000- e State forest at Henryville, Clarke County, Ind. re the students will have the opportunity to study 0 acres of softwood and hardwood plantations, some which are nearly 30 years old, and to observe experi- nts in managing forest plots of farm woodland size a sustained-yield basis.

oodsmen's Short Course at Madison a Success

The woodsmen's short course given recently at the niversity of Wisconsin attracted 16 men, mostly men tually engaged in woods operations who were sent the expense of the lumber and paper companies that nployed them. Others included in the enrollment re 4 rangers detailed by the Wisconsin Conservation ommission, 1 civil engineer and pulp contractor, and timber owner.

The classroom work, which was conducted as a minar, soon developed into exchange of experience d test of new ideas on such subjects as clear cutting rsus selective logging, marking timber in selective gging, the effect of the new forest tax law on selective tting, how to increase the value of the product by oper cutting of the trees into logs, grades available om logs and trees of different sizes, slash disposal, e protection, effect of change from clear cutting to lective logging on the construction of logging rail- ads, advisability of planting, and costs and returns planting. Some of the discussions were led by erators actually engaged in selective logging in the ake States. The plan of spending a week at the niversity in classroom and laboratory work and a eek in the woods as outlined in the Forest Worker for ovember was followed out. The students were ken to the operations of the Holt and Goodman mber companies, where they were entertained and own the methods and results of selective logging as rried on by the two companies.

The students expressed their interest and satisfaction not missing a single discussion, by many practical contributions from their experience, and by a resolution addressed to the university asking that the course be repeated with some additions to the subject matter.

Campaign to Halt Clear Cutting of Arkansas Pine for Pulpwood

William K. Williams, extension forester of Arkansas, is concentrating this winter on an effort to stem the tide of clear cutting of pine timber for pulpwood in the southern part of the State. In this region the cutting of every tree that will make a 3-inch stick of pulpwood is an old and extremely persistent habit. In addition to the two pulp and paper mills now drawing supplies of timber from southern Arkansas one is to be opened in February in Camden. Mr. Williams has the cooperation of county agents and leading business men in holding meetings in schoolhouses and churches, and in distributing posters, leaflets, and press articles.

Forest Work for New York Scouts

A forested camp ground of 10,200 acres in the town of Tusten, Sullivan County, N. Y., is being acquired by the Boy Scout Foundation of the city of New York. The tract borders the Delaware River for nearly 2 miles between Barryville and Narrowsburgh. The work of cleaning the forest growth now on it and of reforesting certain sections will for the most part be done by the scouts themselves. First of all, the area is to be surrounded with a 15-foot fire line.

Maryland Four-H Boys Climb for Cones

Seventeen Maryland boys, members of the Hoopers' Island and Crapo Four-H Clubs, did a good turn for the State department of forestry this fall by climbing loblolly pine trees for cones. The boys collected 145 of the 600 bushels of loblolly pine cones from which the department will extract seed for nursery planting in 1928 and 1929. One boy, John Burton, alone collected 14 bushels.

Scouts to Grow and Plant Their Own Trees

Boy Scouts of Richmond, Va., are going to raise pine trees from the seed to reforest their camp ground in Chesterfield County, about 100 acres of which was burned over in 1926. A small forest nursery is being started at the camp, and sowings will be made of each of the principal species of southern pine. Ten bushels of loblolly pine cones have been donated by P. Ryland Camp, of Franklin, Va. The boys will do all the work of caring for the nursery and planting the trees, under the direction of Field Executive N. M. Pollock and of A. B. Partee, caretaker of the camp.

Forest Service Notes

Lightning Fire Warnings

By H. T. Gisborne, United States Forest Service

The successful control of lightning fires is one of the most baffling problems confronting forest owners in the United States. The records for the part of the forest area that is protected against fire show that during the year 1926 lightning fires did more damage, 31 per cent of the total, than fires from any other cause. By numbers they amounted to only 12 per cent of the total.

Surprising as are these figures for the country as a whole, the records for the northern Rocky Mountain region are even more startling. In Idaho and Montana, during the year 1926, lightning caused 59 per cent of all the forest fires and did 72 per cent of the total damage, in spite of the fact that in these States practically all the forest land is given what is at present considered rather intensive protection. The explanation seems to lie in the fact that the peculiarities of lightning and lightning-caused forest fires are little understood.

Since 1920 more and more scientific investigation has been devoted to the problem of lightning-caused fires, especially in California and the northern Rockies. The method of attack has been the recording and analysis of facts concerning the occurrence, characteristics, and effects of lightning storms. On the higher mountain tops, in these regions, men are stationed throughout the period of fire danger to detect, locate, and report forest fires. The lookouts obviously are well situated also to obtain and report essential information concerning lightning storms. Since 1922 this information has been recorded annually on specially prepared report forms and the mass of more than 5,000 storm observations, covering five fire seasons, has been analyzed under the supervision of the Northern Rocky Mountain Forest Experiment Station. This investigation has taught us the following facts which can be used in improving forest protection in the northern Rockies.

The period of danger from lightning is usually confined to the 122 days between June 1 and September 30. During this period extra protection in the form of lookouts, smoke chasers, etc., must be on the ground prepared to go into action on a few hours' notice. The danger is not evenly distributed throughout the period, but occurs in waves or peaks, which usually occupy a total of about 15 days. The protective organization, therefore, is called on for the suppression of lightning fires during only 12 per cent of the period of employment. This means that the men can be used for other work such as constructing roads, trails, and tele
lines, and for fighting fires from other causes,
107 days of their employment.

The analysis of the lookout reports indicates
the condition causing the storms often prog
easterly across the region, and that warnings bas
recognition of the cause may be used to good adva
Single storms have seldom been found to travel
than 60 or 80 miles as an uninterrupted unit.
the storm ceases to emit lightning after cover
narrow path only 10 or 20 miles long. Only tw
calities have yet been found where storms see
follow a certain well-defined path, and neither of
is long enough to permit the useful telegraphi
warnings ahead of the storms.

The records show very clearly that the char
lightning fires is not, as had been thought, in con
proportion to the number of thunderstorm days.
instance, in western Montana only one lightning
out of ten is a fire starter, whereas in northern I
during the past few years, one storm out of ever
has been productive of fires. Hence, even th
storms may be forecast accurately by the We
Bureau, the occurrence of lightning fires can n
predicated solely on the occurrence of storms.

Practical experience long ago led to recogniti
the fact that the so-called "dry storms" are the
dangerous, but thus far no dependable definitio
been available to indicate how much rainfall d
guishes a wet from a dry storm. The lookout re
furnish data on this point which appear to be
usable. For instance, the average lightning stor
this region brings a total of about 45 minutes of
before and after the lightning. (The amount of
rain was not determined in inches because the
outs must report on many storms that are at a dist
from them; in fact, only 47 per cent of the storms
ing the years 1924, 1925, and 1926 passed directly
any of the 170 lookouts in this region.) Depar
from this 45-minute average if correlated with
occurrence of fires should be significant in rating
degree of danger in a storm even before fires have
time to smoke enough to permit detection.

When the data on fire-starting storms, base
more than 3,000 usable reports, were separated
those pertaining only to the storms that did not
fires, it was found that the average safe storm bro
a total of about 50 minutes of rain before and
the lightning, whereas the average fire-starting s
brought only 39 minutes of rain. This difference
though not great, indicates that one characterist
the danger in lightning storms is the duration o

ain before and after the lightning. The greater the xcess of rain above the average, the less the danger; he greater the deficiency, the greater the danger. his knowledge is easily applicable in improving forest rotection, because lookouts can time the rainfall and eport the departures to the fire-fighting organization sually hours before many of the fires begin to smoke up.

Another characteristic of lightning storms that can e observed and used in estimating the number of the esultant fires is the percentage of lightning strikes. n the northern Rockies, when more than 60 per cent f the lightning flashes are from the clouds to the round the storm is usually a fire starter. If, on the ther hand, less than 40 per cent strike the ground, hen the storm is apt to be of the non-fire-starting ype. Here again the lookouts are able to determine he fact of interest and to report it to the smoke chasers r rangers often hours before the majority of the fires ppear.

The period of time available for warnings has been ound by this study to be much greater than practical xperience alone had previously indicated. Even if a torm is so local that it is not forecasted by the Weather Bureau, its first actual appearance may be used as a warning hours in advance of the discovery of fires resulting from it. Usually each lookout will discover several fires after each "dry" storm, and these may be grouped into first discoveries, second discoveries, third, fourth, etc., according as the lookout reports one, two, three, or four fires. The analysis of the reports shows that 44 per cent of the first discoveries are not made until five hours or more after the storm has first appeared. If the storm's appearance is reported immediately to the rangers this period of five hours can, of course, be used very advantageously to move men and prepare for fire suppression. At the end of this five-hour period 49 per cent of the second discoveries, 54 per cent of the third, and 59 per cent of the fourth are still to be expected. In fact, 9 per cent of all the fires usually do not show up until 48 or more hours after the storm is first sighted. Such a warning of impending danger obviously can be used to great advantage.

There are, of course, occasional exceptions to the above statements. It is probable, also, that factors other than those mentioned are of considerable importance in determining the number of fires to be expected from lightning storms in the northern Rockies. Some of these factors, such as the moisture content and the consequent inflammability of different timber types before the storms occur, are being studied by the Northern Rocky Mountain Forest Experiment Station.

The most important fact so far brought out by this investigation is that the mere appearance of a lightning storm, if reported immediately, serves as a very appreciable warning of impending danger. The warning can then be localized and the degree of danger can be estimated with very usable accuracy if the path and characteristics of the storm are noted by the lookouts and reported to the fire-fighting organization. On the basis of these warnings, and the 36-hour forecasts by the Weather Bureau, men can be removed from other work and held in readiness to reach and suppress fires with the least possible delay. In the northern Rocky Mountains to-day the forest protective organization is beginning to take action sometimes even a day before the storms appear and very often immediately after the first report of a storm's appearance. As this preparatory action becomes even more common and more clearly defined a marked lowering of the damage caused by lightning fires is certain to result.

Air Chambers for Steam Fire Pumps

By George L. Drake, United States Forest Service

Experience has shown that the general-service steam pumps with which most donkeys and locomotives are equipped cause a throbbing of the hose lines, due to the impulses of the water being discharged from the pump. This throbbing is most pronounced in the length nearest the pump and results in the blowing off of fittings and the chafing through of the hose where it passes over sharp objects. Fires have escaped control by the failure of the water supply from this cause. The use of heavy steam or air hose on the length next to the pump, and double-strength hose for the next length, has tended to remedy this trouble.

Ranger L. D. Blodgett, of the Olympic National Forest, has found a cheaper and more permanent way of overcoming this throbbing by installing an air chamber in the discharge line. This device can be made by a camp blacksmith or machinist at slight cost. A homemade air chamber that has been found to work successfully on the 3 by 2 by 3 and 1½ by 3 by 4 pumps commonly in use is made by installing a **T** in the discharge line and fitting to this by a nipple and reducer, or a welded plate, a section of larger pipe with a cap or solid welded plate on the other end, which acts as an air chamber. Where a 4-inch pipe is reduced to a 1-inch **T**, 4 to 2 and 2 to 1 reducers are necessary. For pumps of 1-inch discharge the air chamber should be made at least 4 by 10 inches, and for pumps of 1½-inch discharge not less than 4 by 14 inches. The air chamber can be placed between the pump and hose connection where most convenient; all that is necessary is that it be set in an upright position and be air tight. If there is the slightest leak in the top of the chamber, it is useless.

An air chamber of this type installed on a 3-cylinder geared pump exploded last winter and injured the pump man. The discharge line had frozen up, and with the high pressure developed by the pump some part had to give way. On pumps of this type it would seem advisable to install a safety valve to avoid such accidents. Where air chambers are used on steam pumps to which hose lines are attached there is no danger, as the hose line would burst before any part of the pump or air chamber.

Do Understocked Stands Ever Catch Up?

By DONALD BRUCE, United States Forest Service

Many investigators have been struggling to determine at what rate understocked stands approach normality. The problem seems almost insoluble except through repeated measurements of permanent sample plots over long periods of years. In view of the effort that is now being expended on such measurements in this country it seems pertinent to challenge the assumption underlying this work. Is there any definite evidence that understocked plots do approach normality? It seems reasonable that they should, but certainly the evidence that has been published is far from conclusive.

"The Forests of Finland," a recent publication by Yrjö Ilvessalo, describes the methods and results of a comprehensive survey of all of Finland's forest land, in which the entire country was sampled by the strip method. This enormous work was carefully planned and was checked with equal care by means of statistical analyses which indicate that the probable errors in the results obtained are astonishingly low. Two tables in this volume may throw light on the question just raised.

In Table 95 there is a comparison between the present average volume per acre and the normal volume indicated by yield tables. This is given by types and age classes. The ratio between these values of course expresses the degree of normality. In Table 119 there is a similar comparison between the present and the normal annual growth per acre. The actual growth has been determined by mean sample tree methods, and the normal is taken from standard yield tables.

If understocked plots are approaching normality the ratio between the actual growth and the normal growth must be higher than the ratio between the actual volume and the normal volume. These ratios, while not stated in Mr. Ilvessalo's tables, may readily be calculated from them. The comparison (based on the broader type classification used) is as follows:

Type	Age class	Ratio of actual to normal (per cent)	
		For growth	For volume
Pine	1- 20	88	100
	21- 40	63	66
	41- 60	61	63
	61- 80	53	53
	81-100	56	57
	101-120	55	66
Spruce	1- 20	137	110
	21- 40	72	85
	41- 60	56	63
	61- 80	48	54
	81-100	48	51
	101-120	69	51
Birch	1- 20	94	92
	21- 40	61	70
	41- 60	62	64
	61- 80	68	62
Average	----------	68	69

These figures give no support to the hypothesi understocked stands approach normality. Out instances of understocked stands, only 4 show evidence of an approach to normality and 9 sho opposite trend. The single overstocked stand i only one growing faster than normal. The ave of the two columns of percentages indicate tha method of predicting growth through yield tabl assuming that the degree of normality will re unchanged is essentially accurate in the long run

It may be rash to draw this conclusion from Finnish tables. It is hard to appraise the accura all parts of the work described and dangerous to re by analogy from Finland to America. The figures with presented raise a question rather than answe

A Tree Classification for the Selec Forests of the Sierra Nevada

A new tree classification for the pine forests of fornia that bids fair to revolutionize practices in m ing timber for cutting in this region has been de by Duncan Dunning, associate silviculturist of California Forest Experiment Station. Observa on permanent sample plots over a period of 15 y and the analysis of 20,000 numbered trees are bases for the new classification. Mr. Dunning h that the classification by crown dominance, wi used by foresters, is inadequate for the all-aged forests of California. In its place he has set up a thrift classification in which he divides the stand seven classes defined by easily observed character fluencing thrift. The major characters considerec age, degree of dominance, and crown developm Confirmatory indications of relative vigor consid are form of top, color and density of foliage, chara of bark, size of tree, etc. The new system giv more definite basis for the selection of trees for m ing and makes possible the checking of marking cut-over lands.

The seven proposed classes are as follows:

Class 1.—Age class, young or thrifty mature; *p tion*, isolated or dominant (rarely codominant); *cr length*, 65 per cent or more of the total height; *cr width*, average or wider; *form of top*, pointed; *vi* good. Class 1 trees grow at the best rate and h the lowest loss-liability factor. They are the l susceptible to insect attacks. They are good s bearers when of sufficient size. The present valu timber from such trees is comparatively low. T should practically always be retained when sound.

Class 2.—Age class, young or thrifty mature; *posit* usually codominant (rarely isolated or domina *crown length*, less than 65 per cent of the total hei *crown width*, average or narrower; *form of top*, point *vigor*, good or moderate. Class 2 trees make growth, but are rather liable to loss and are p seed bearers. They should be marked in prefere to the larger class 1 trees, when there are suffici her thrifty trees to make up the reserve, or in inning groups.

Class 3.—Age class, mature; *position,* isolated or ominant (rarely codominant); *crown length,* 65 per ent or more of the total height; *crown width,* average r wider; *form of top,* round; *vigor,* moderate. Class trees grow rather slowly but increase in value can e expected without great risk of loss. They are good ed bearers. The usual tendency is to retain too any trees of this type. Where sufficient class 1 ees are lacking, where good seed trees are needed, r where a second cutting must be provided for, there hould be no hesitancy in leaving such trees.

Class 4.—Age class, mature; *position,* usually coominant (rarely isolated or dominant); *crown length,* ss than 65 per cent of the total height; *crown width,* verage or narrower; *form of top,* round; *vigor,* modrate or poor.

Class 5.—Age class, overmature; *position,* isolated r dominant (rarely codominant); *crown,* of any size; *rm of top,* flat; *vigor,* poor. Usually the largest ees in the stand. Class 4 and 5 trees produce pracically no growth even on the best sites. Their ability to loss is high. Their retention involves isking a large investment in high-quality timber. hey should always be cut unless there are no other vailable seed trees.

Class 6.—Age class, young or thrifty mature; *posiion,* intermediate or suppressed; *crown,* of any size, sually small; *form of top,* round or pointed; *vigor,* noderate or poor.

Class 7.—Age class, mature or overmature; *position,* ntermediate or suppressed; *crown,* of any size, usually mall; *form of top,* flat; *vigor,* poor. Class 6 and 7 rees are usually too small to be merchantable. Class trees grow fairly well and give promise of later levelopment if released. They bear practically no eed. When merchantable, they should be cut unless elief from competition is assured. Class 7 trees are ndesirable from every standpoint and should always e cut if merchantable.

Purchase of Land for National Forests Authorized

Purchase of 74,077 acres of land as additions to national forests has been authorized by the National Forest Reservation Commission as the outcome of a meeting held December 7. The expenditures thus approved amount to $1,307,714, averaging $17.65 per acre.

At the head of the list of proposed additions is the Waterville Valley in the White Mountains of New Hampshire. This area of 22,539 acres, embracing such scenic features as the Mad River Notch and the Greeley Ponds, includes not only extensive stands of young forest growth but merchantable timber worth more than $1,000,000. The largest area covered by the authorization is 40,294 acres in Arkansas, the approved purchase price of which averages $2.87 per acre. This land, consisting for the most part of small holdings, is scattered over the mountain region of the northwestern part of the State, mainly in Garland, Hot Springs, Yell, Scott, and Perry Counties. Unusual importance is given to the proposal of national forest management for this land by the fact that this mountainous section was the source of a great proportion of the floodwaters that recently devastated the Mississippi Valley.

In Pennsylvania the commission authorized the purchase of 6,141 acres in McKean, Forest, and Warren Counties, all well-timbered lands carrying good stands of merchantable stock; in Tennessee, 1,905 acres in Sullivan, Unicoi, Monroe, and Polk Counties; in North Carolina, 1,483 acres in Macon and Swain Counties; and in West Virginia, 57 acres in Pendleton County.

With these additions, 2,966,818 acres of land in the eastern half of the United States has been purchased or is being purchased for national forest purposes.

Allegheny Forest Experiment Station Organized with Headquarters at Philadelphia

The Allegheny Forest Experiment Station is being organized with headquarters at 3438 Walnut Street, Philadelphia, Pa. Offices have been furnished by the University of Pennsylvania, which will cooperate with the United States Forest Service in the work of the station. Field work will be conducted at various centers, or branch stations, in Pennsylvania, Maryland, New Jersey, and Delaware, in cooperation with the State agricultural colleges and State forestry departments and with a number of other educational institutions and organizations.

The interest of the station will eventually extend to nearly every phase of timber growing. Although substantial progress is being made by the State forestry organizations of Pennsylvania, New Jersey, and Maryland in silvicultural as well as in fire-control studies, a great need for forest research is presented by these States. Their vast original forests of hardwoods, white pine, and hemlock, of a quality unexcelled in the United States, have practically all been cut to meet the demands for wood for use in manufacturing, mining, and agriculture. As a result of close cutting and of fires much of the 18,000,000 acres of cut-over land is reforesting very inadequately. At present the four States produce in a year about one-eighth as much lumber as they consume. The scrub oak lands of Pennsylvania and the ragged pine stands of southern New Jersey are outstanding examples of the rehabilitation problem that faces the forester in this region.

The staff of the station, headed by R. D. Forbes, formerly director of the Southern Forest Experiment Station, New Orleans, will consist at the start of seven persons.

New Increment Measuring Instrument

An increment measuring instrument invented by Duncan Dunning, of the California Forest Experiment Station, has been patented by him in behalf of the Government and people of the United States. Mr. Dunning's device provides a safe resting place for the increment core, and gives opportunity to adjust its position so as to determine a starting point from which to count rings or to measure the space occupied by a series of rings. A sliding magnifying glass similar to that used on a common slide rule is provided for use in examining indistinct or very fine rings. The instrument looks very much like a slide rule, with a groove instead of the central slide. This groove receives the core to be measured and can be adjusted to hold it firmly.

It is predicted that all those who in the past have sworn vigorously when they have dropped and broken cores will bless Dunning for his ingenuity.

Western White Pine Killed by Light Fire

The extreme sensitiveness of western white pine to fire is illustrated by the results of a light fire that occurred on the Quartz Creek area of the Kaniksu National Forest, Idaho, in July, 1926. A study of fire damage on part of this area in the summer of 1927 indicated that a considerable proportion of the white pine trees had been killed outright, but many were still green. Examination of a large number of these green trees showed that the majority were dead but were drawing some moisture from the sapwood. Losses will approximate 100 per cent of the stand. A partial explanation of the reproduction of white pine after fires which has been in part attributed to seed storage appears in the fact that many of these green but dead trees were producing seed.

Count of Western Yellow Pine Seed-F

A count of western yellow pine seed fallen to ground on the Breece sale area of the Manzano Natio Forest, New Mexico, shows an average of 4.4 seed square foot, the equivalent of 181,664 seed per ac The count was made on 74 plots of 1 square foot ea in several localities, at regular time intervals. Si seed were still falling when the observations ended it probable that the total number of seed per acre exceed 200,000. Studies of the Southwestern Fo Experiment Station have indicated that only ab one western yellow pine seed in one thousand produ a seedling that lives to be 5 years old. If this ra holds, three seed crops such as that observed on Manzano will be required to produce satisfact restocking of the cut-over land.

War Department Takes Back Milita National Forests

A presidential order of December 2, 1927, revo previous orders creating the military national for Benning, in Georgia; Eustis, in Virginia; Meade, Maryland; and Pine Plains, in New York. T action is due to the fact that larger areas on tl tracts are now required for military use. A bo consisting of two Army officers and two officers of Forest Service has been appointed to consider situation on the remaining military national forests

Choctawhatchee National Forest

The Florida National Forest, recently diminished the segregation of its eastern division as the Oc National Forest, has been given a new name. executive order of November 10 designates it as Choctawhatchee National Forest.

General Forest News

Congress Appropriates for National Arboretum and Botanic Garden

Expenditure of $300,000 to acquire land for a national arboretum in the District of Columbia is authorized by the deficiency bill signed December 22. A tract of about 400 acres on the Mount Hamilton and Hickey Hill areas, about 2 miles from the Capitol, has been chosen as the site for the development of the arboretum, the importance of which was discussed by George B. Sudworth in the Forest Worker of March, 1927.

Another item in this bill provides $600,000 for enlarging the United States Botanic Garden, Washington, D. C.

Blister Rust Jumps Two Hundred Mi

The white pine blister rust has shown ability jump over distances of two or three hundred m in favorable seasons, according to data collected c ing the 1927 season. H. G. Lachmund, of the Bur of Plant Industry, records the finding of spores on v Ribes south of the international boundary of Bri Columbia and north of Prince George, 120 miles fart north than ever before. In the coastal region of B ish Columbia the disease was found more than miles beyond the limits of western white pine th and 190 miles farther north than in any previous son. Its spread included the Queen Charlotte Islan 90 miles off the mainland and a full 200 miles nc and west of the northern limits of the coastal bel stern white pine. The disease was discovered on ıes near Spirit Lake in the Cascade Mountains near e mouth of the Columbia River and on Ribes near est River, Idaho, well within the western limits of e main commercial range of western white pine.

The seasonal spread of the disease in the West is ıally greatest toward the north and east. A new eory is advanced as the probable explanation of this. e leaves of most species of Ribes develop resistance the infection soon after, if not shortly before, they ch full size. Ribes leaves to the south may, if there an early spring, be too far advanced to accept infecn readily by the time the main production of the ores on the pines begins, whereas to the north there always plenty of Ribes leaves at the stage of developent to accept infection.

nproving Timber Growth in Northern Swamps

By Raphael Zon, United States Forest Service

There are some 9,000,000 acres of swamps and swamp rests in the northern portions of Michigan, Minneta, and Wisconsin. From a production standpoint any of the swamp forests must be classed as almost aste land. In a typical black spruce swamp, for inance, the growth is about one-tenth of a cord per acre er year. Yet the swamp forests are the only extensive rgin forests remaining in the Lake States. And they e the source of pulpwood, poles, and posts—materials ıat are becoming increasingly scarce.

These swamps can be made into productive forests ıst as hundreds of thousands of acres of such land ave been made into profitable forests in Finland, weden, Norway, and northeastern Russia. This does ot require complete drainage, but can be brought bout by means of superficial ditching that sets the agnant water into motion and removes the excess. uch drainage does not make the swamp a forest fire ıenace and does not make land available in advance f actual needs, but converts it almost immediately into roductive forest land, improves the natural cover for 'ild life, and contributes to the regular feeding of the treams.

In Finland some 800,000 acres of swamp lands have een drained to improve the forest growth. In Sweden he forest service spent $326,000 for such ameliorative vorks on the State forests between 1875 and 1920, and s at present expending some $116,000 for this purpose ach year. In addition, the Forest Owners' Associaion of Sweden, a private organization, during the decde 1911–1920 drained on an average some 36,000 cres per year.

Observations and experiments of the Lake States Forest Experiment Station have shown that in swamp orests where poor growth before drainage has been due xclusively to excess water, drainage causes an immeliate increase in growth in all trees. Just as in the ase of Norway spruce and pine in Europe, so in the ase of our own tamarack and black spruce in northern Minnesota, after removal of the excess water the growth in diameter is increased from 2½ to 3 times, the growth in height from 2 to 7 times, and the growth in volume from 12 to 23 times. If normal growth of the forest stand in the swamp has been prevented not only by excess water but also by certain physical or chemical properties of the soil, the effect of the drainage is not uniform, is not shown in all trees, and does not manifest itself until after a more or less prolonged interval. The increase in growth is considerably less in deciduous trees, such as birch and aspen, than in conifers, such as spruce, pine, and tamarack. In spruce, tamarack, and other conifers the increase is influenced by the depth of the tree's roots. The more superficial the roots, the greater the increase in growth due to drainage.

The drainage of swamps makes the top soil suitable for germination of tree seeds, and so leads to the appearance of abundant young growth.

Side by side with its beneficial effect upon forest vegetation, drainage of swamps produces also an injurious effect. If the conditions in which the forest has grown up are radically changed by drainage, as the result of the drying of the peat the old trees begin gradually to die out. Another cause of the deterioration of the old trees is the settling of the peat after drainage, which exposes their roots.

Drainage of swamps for forest purposes must not be carried to extreme lengths. Although the effects are fairly well understood and extensive operations of this kind are being carried on in Europe, a number of questions remain open as to the possible results of such drainage.

An example from Sweden of the profitableness of draining swamp forests may be mentioned. A mixed pine forest about 60 years of age, located on very swampy land, was drained in 1915. Before drainage the annual growth was at the rate of 41.4 cubic feet per acre. Seven years later, in 1922, the annual growth per acre reached 159 cubic feet, an increase of 117.6 cubic feet per acre per year. The stumpage value of this timber in Sweden amounts to 5.3 cents per cubic foot. The increase in annual growth, 117.6 cubic feet, is worth $6.23 per acre. This almost exactly covers the cost of drainage, which amounted to $6.61 per acre. In other words, the drainage was paid for by the increase in the value of growth in the seventh year after drainage.

Accelerated tree growth in drained swamp lands of the Lake States is illustrated by a Minnesota tamarack cut in the fall of 1925. The swamp in which this tree grew was drained in 1918. The contrast in the tree's annual growth before and after drainage appears in the following figures:

	1918	1925
Age	49 years	56 years.
Diameter	1.1 inches	2.6 inches.
Height	10 feet	20 feet
Volume	0.036 cubic feet	0.379 cubic feet.

How Pacific Coast Builders Will Fortify Against Termites

The provisions against termite damage and wood decay which the Pacific Coast Building Officials Conference recently added to its uniform building code, on the recommendation of Thomas E. Snyder and other scientists of the Department of Agriculture, are as follows:

SECTION 2511.—PROTECTION FROM TERMITES AND DECAY

(*a*) Timber to be used in contact with the earth shall be thoroughly impregnated by a standard pressure process with coal-tar creosote or other approved preservative except as provided in section 2204 (2). Timber should be completely framed before treatment whenever possible but when cutting after treatment is unavoidable the cut surfaces shall be thoroughly coated with coal-tar creosote or other equivalent preservative.

(*b*) Wood and fiber products not impregnated with an approved preservative shall not be placed in contact with the earth or within 15 inches thereof, excepting posts over a concrete floor as provided in section 2505 (*a*) and, in certain minor buildings, as provided in section 2204 (2).

(*c*) Masonry foundations and footings shall be laid in Portland cement mortar. Foundations built up of masonry units, whether hollow or solid, shall be capped below woodwork with at least 1 inch of Portland cement mortar, cement and slate, or other approved seal.

(*d*) In cities where buildings are subject to termite attack a termite shield shall be provided, continuing completely around the surface of the foundation below the woodwork of the building on both the inside and outside surfaces. Such shield may be formed of a strip of noncorrodible metal firmly inserted in the surface of masonry or between the foundation and the wood, with the projecting edge bent downward at an angle of 45 degrees and extending horizontally at least 2 inches from the face of the foundation.

(*e*) Floor sleepers or joists imbedded in masonry or concrete or laid on concrete which is in contact with the earth shall be impregnated with an approved preservative.

(*f*) Untreated wooden posts or columns supported by concrete floors must rest upon a metal or concrete footing projecting at least 2 inches above the finished floor.

(*g*) The ends of beams and girders entering masonry or concrete shall not be sealed in, but shall be provided with boxes affording an air space at the end of the piece as provided in section 2506 (*e*).

(*h*) Where there are spaces under floors near the earth they shall be excavated so that there will be no earth within 12 inches of the wood and they shall be provided with cross ventilation as specified in section 2205.

Recommendations of National Cc
ence on Commercial Forestry

Discussion of commercial forestry at the n
conference held for that purpose in November
Chamber of Commerce of the United States led
following conclusions:

"This conference is convinced that it is funda
to national welfare to produce a continuously
supply of wood upon the 470,000,000 acres of lar
will be idle if not kept in forest. The business o
ing timber on one-fourth of the nation's land are
a par with agriculture as the foundation of the An
economic and social structure.

"* * * To continue reforestation, to exp
to meet national and community requirements, t
lowing measures are necessary:

"1. Adequate public protection against fores

"2. Equitable and stable taxation.

"3. Full technical and economic information tl
research.

"4. Complete recognition by the people of Sta
Federal responsibility."

The conference adopted these recommendatio

"That the Clarke-McNary National Forestry
effectuated by immediate provision by Congress
full amount of the annual appropriations it auth
thus extending systematic fire protection and it
benefits throughout the country.

"That our land taxation systems be thor
investigated and equitably revised to the end th
public revenues shall be protected; and, at th
time, the vital public economic interest of thous
communities in the continued productivity c
areas of land shall be safeguarded.

"That comprehensive forestry research sh
authorized and vigorously supported by Congr
that reforestation and wood utilization may b
intelligently directed.

"That State and Federal forest agencies
cooperation we appreciatively recognize, shal
their hands strengthened. That recognizing th
sponsibility, forest land owners assume as a civ
the leadership in this great national business ent
already well begun."

Windbreaks Do Protect Orcharc

Investigations to determine the value of winc
to orchards in southern California were carr
during the winter of 1926–27 under the genera
tion of Extension Forester Woodbridge Metc
series of anemometers placed near orange o
protected by blue gum plantations showed consi
three times as much wind movement in the
tected as in the protected portions of the or
On an occasion when the anemometers in th
showed 400 miles of wind in 24 hours, those set
feet in the lee of a 65-foot windbreak recorde
one-third of this total wind movement.

Slash Pine for Central Georgia

By W. R. MATTOON, United States Forest Service

lthough the natural range of the slash pine in orgia falls short of covering the southern half of the te, this tree is being grown with promise of success n 50 to 75 miles farther north. Numerous sowings de in 1919 and following years in seed beds at the te college of agriculture, at Athens, Clarke County, e shown uniformly strong, vigorous growth, the es reaching an average height of 1 foot the first year l heights of 2 to 3 feet in two years. At Winter-e, in the same county, Harry Pittard has a bed of h pines 2 years old that have grown waist high. ne trees that were dug up in south Georgia in Febru-, 1924, as 2-year-old seedlings about a foot high, l set out near Winterville, now range up to 9 feet in ght, and in the season of 1927 made a growth of from to 30 inches.

n November, 1923, Boy Scouts of Macon, Ga., ved some slash-pine seed in spots in hard, gravelly on an abandoned field that is part of their camp und. The forester in charge of the sowing did not ect the seed to grow, but intended merely to give boys a lesson in the technique of planting. The owing August not a spot could be found that did have two or more trees growing, and some spots had many as 20 seedlings, from 5 to 9 inches in height. October, 1927, these trees had grown to heights of m 6 to 9 feet. Wild slash-pine stock gathered in anuel County, in central Georgia, and planted in rch, 1924, on the same scout camp ground, has now wn into a beautiful young forest. In 1927 most the trees, now 5 years old, grew from 20 to 30 inches some grew as much as 36 inches. Most of the es measure from 7 to 9 feet in height.

These plots of planted slash pine, in locations from to nearly 100 miles north of the tree's natural ge in Georgia, are almost equaling the rate of growth the species in the localities where it grows naturally. dications are promising that the slash pine will grow the middle and lower piedmont regions of Georgia sizes at which it can be used for turpentining and er for pulpwood, crossties, poles, and saw logs.

In one respect slash pine far outranks loblolly or short-f pine for use in starting plantations: It is prac-ally immune to the attack of the tip moth, which ring the year 1927 damaged from 70 to 90 per cent all the loblolly pine planted in Clarke County, Ga., the vicinity of the State college of agriculture. ortleaf is known to be attacked and sometimes riously injured by this insect.

Slash pine should be set out when one season old, r in the second season the trees get to be too large for ansplanting. It should be planted on warm situa-ons. An important caution to be observed in plant-g this tree north of its range is to avoid situations that e wet, frosty, or very dry.

Which Side of the Fence?

By PHILIP C. WAKELEY, United States Forest Service

The futility of attempting to reproduce longleaf pine without protection from fire and hogs, and the aggressiveness of the species under adequate protection, are convincingly shown by a small stand of 15-year-old longleaf near Henleyfield, Miss. The patch of land belongs to a thrifty negro farmer, who some 15 years ago decided to cultivate it and accordingly inclosed it with a rail fence. Since the plot adjoined some cut-over lands of a lumber company that were burned annually, the farmer plowed two furrows outside his fence to protect the rails from fire.

For some reason the land was not cropped. A few longleaf pines left by the lumber company bore cones abundantly and seeded in both the company's land and the farmer's field. Instead of turning the seedlings under the farmer left them for another season, plowing his line as before. He has them yet, a fully stocked stand of thrifty saplings, pretty as a picture, still protected by the old rail fence and the annually renewed double furrow. Any seedlings that started between the fence and the fire line were cleaned out by the hogs. Outside the line, hogs and annual fires got all but an isolated longleaf here and there, leaving the land to scanty grass and worthless brush.

S. W. Greene, director of the Coastal Plain Experiment Station, who has called attention to the stand, used a picture of it on his 1927 American Forest Week circular under the caption "Which Side of the Fence Are You On?"

Some Ribes Eradication Work in the West

The work of eradicating the cultivated black currant has been completed in Montana, Idaho, Washington, and Oregon, and two-thirds completed in California, according to a report made by Stephen N. Wyckoff of the Bureau of Plant Industry at the Western White Pine Blister Rust Conference at Portland in November. Wyckoff also announced that Ribes petiolare, which occurs in great numbers in stream bottoms of the white pine type and which on account of susceptibility to the blister rust is a serious menace to nearby stands of pine, can be more effectively and cheaply eradicated by chemicals than by hand pulling. The estimated saving through the use of chemicals is 35 to 50 per cent.

Satin Moth Quarantine Extended

The satin moth quarantine order of the Federal Horticultural Board which became effective November 15, 1926, has been amended to cover 88 towns in Maine, 4 in New Hampshire, and 25 in Massachusetts in addition to the territories previously designated.

Charcoal from Lodgepole Pine

At Bernice, Mont., 25 miles from Butte on the Helena highway, lodgepole pine of inferior grade from the Deerlodge National Forest feeds what are said to be the only commercial charcoal pits in the State. Oscar Carlson, who came to this country from Sweden 40 years ago, carries on the work with his son by the same methods that his own father followed in making charcoal for steel refineries in central Sweden.

In the construction of a pit a hollow triangular structure of wood is placed on the ground and 10-foot lengths of timber are piled on end around it until the pile is about 40 feet in diameter. Over the pile of wood is placed a thick layer of fir boughs, and over this a heavy layer of earth which is kept in place by a system of braces. Small flues are left open at intervals of 6 feet around the base. Then dry shavings and pieces of wood are placed in the small central opening and set on fire. When the fire has burned awhile and more dry wood has been placed on it, the top opening is blocked with wood and earth. By regulating the draughts the fire is kept so low as not actually to burn the wood. The pits are tended carefully, night and day, for from three to seven weeks, according to the size of the pile and the condition of the wood. Then the fire is drawn and water is applied to the smoldering mass. If the work has been done with proper care, Carlson says, the charred timbers stand in their original positions, retaining their annual rings and the marks of the ax.

The pits are burned each spring and fall, and at each burning yield about 270 tons of charcoal.

Eddy Station Seeks to Develop Fast-Growing Strain of Pine

The Eddy Tree Breeding Station at Placerville, Calif., is concentrating its work on the effort to develop fast-growing strains of pine and walnut. The pine is getting first attention. To find out which is the fastest growing species the station is making nursery and plantation tests of every species of pine of which seed can be obtained. Nursery plantings made in the spring of 1927 include seedlings of 49 species and 9 varieties, from seed obtained in 17 different countries. Pines of the same species grown in different localities and sites are being tested in order to find which are the fast-growing geographic forms. This method of study has so far been used chiefly with western yellow pine from British Columbia, Nebraska, and five Western States. The tests are made with seed planted in the nursery. To find in the forest individual trees of the important species of pine from which to start new strains, seed are collected and planted in the nursery and the selection of fast-growing parent trees is made on the basis of the relative growth of their progeny. To find individual planted trees with this fast-growing characteristic the largest seedlings are picked from reforestation nurs all over the country, shipped to the station, and pla in the arboretum where they can be given com tively uniform conditions for growth. The vigorous seedlings planted in the winter of 19 have already shown superiority in subsequent gr over check trees rated as "normal" at the time plantings. The most rapid growing of these vig specimens grew three time as fast in height a average "normal" tree.

In addition to the selection methods just desc hand pollination is being employed to cross spec order to get hybrid vigor or combine good qu of two or more species. Crosses are also made bet geographic forms and between especially fine in uals of a species. Self-pollination is used to fix des characteristics that may be found, to segregate of certain species, and to increase the accuracy progeny tests. Pollination work in 1927 was with western yellow, Monterey, sugar, Jeffrey, w white, knobcone, lodgepole, and digger pines northern California black walnut. Pine polli work in 1926 yielded seeds of the cross western pine X Swiss mountain pine, and the cross w yellow pine X digger pine.

The Eddy Tree Breeding Station is on a tract acres, of which 40 acres are in nursery and 18 a arboretum. The site is near the lower edge western yellow pine belt in the central Sierras elevation of 2,700 feet. All the timber species lower Sierras are found in the station grounds or n The climate is comparatively mild and the g season is 205 days. The soil is well adapted nursery and arboretum and the even topograph tributes toward making conditions very muc over the whole area.

The station staff is composed of Director Austin, Forester John S. Barnes, Propagator Lumsden, and two assistants.

Hardwoods That Once Grew in th Yellowstone

New evidence has recently been brought to lig magnolias, sycamores, and chestnut trees onc ished in the region of the Yellowstone, where t wood is also known to have lived. The blastin of a ledge to widen a section of the park's lo between Mammoth Hot Springs and Camp R has revealed tons of rock bearing the fossil im leaves and twigs of these species. The outli wonderfully distinct. In the opinion of Prof Mason, of the University of California, the of which this rock was formed accumulated 4,000,000 years ago during a volcanic erupti destroyed the trees and buried the leaves. F abundance of chestnut leaves it appears t chestnut was one of the most common trees prehistoric forest.

Foreign Notes

rees Protect Canadian Pacific Tracks from Snow Drift

om an article by B. M. Winegar, General Tie Agent, Canadian acific Railway, in the Illustrated Canadian Forest and Outdoors)

In an effort to find something less expensive than oden fences to keep snow from drifting and piling its tracks, the Canadian Pacific Railway began in 16 to experiment in developing snowbreaks of trees. 4-year trial was made with transplants of carragana iberian pea), laurel leaf willow, and the native nifers. It was found that carrangana and laurel f willow, although their mortality in transplanting s low, did not retain enough branches close to the ound to afford the desired protection and were too sily broken by drifting snow. Among the native nifers the greatest promise was shown by cedar, ruce, jack pine, and Scotch pine. Scotch pine thstood transplanting best of all and offered added lvantages in that it adapts itself to any kind of soil d retains its lower branches when pruned back to y height. Cedar is recommended only for the otection of a deep cut or where in level country it is pplemented by a portable fence.

The planting scheme adopted by the railway comny calls for a combination of spruce with Scotch ne. The spruce is used in the front rows and the ore rapidly growing Scotch pine in the rear.

As early in the season as possible, a strip of ground 0 to 12 feet wide is thoroughly plowed and harrowed. esides preparing the soil to receive the young trees is affords fire protection. Spring planting begins s soon as the frost is entirely out of the ground and n be continued for about four weeks. In the fall, lanting starts about the first of September and can be ontinued until heavy frost comes. Transplants 12 16 inches high are used. The rows of trees are paced 4 feet apart and staggered. To replace indiidual trees that may die after planting a number of xtra trees are planted 2 feet apart in a convenient ocation. The first year after planting the 12-foot trip is kept cultivated to a depth of about 3 inches by he use of a horse cultivator and, close to the trees, a and hoe. Care is taken to keep grass, herbage, roots, r rubbish from collecting around the base of the young rees, since this would tend to kill the lower branches.

The ultimate height of the trees is limited to 10 feet r less. In order that the trees may grow bushy enough o stop drifting snow, their upward growth must be etarded before they grow to within 2 feet of the final height desired. For example, if a snowbreak 8 feet high is required the trees are pruned when they reach a height of nearly 6 feet. Pruning is done in the first half of June. The growth of the current year on the main stem is pruned off, with the result that the top branches spread out and grow up to form new tops to the trees.

Since 1919 the Canadian Pacific has planted some 110 miles of snowbreak along sections of track that are subject to drift either because they are level with the surrounding country or because they run through cuts.

Along sections of track between Montreal and Quebec barriers of trees were planted in 1916 as a protection from drifting sand, which formerly had to be cleared from the tracks, at frequent intervals. Here Carolina poplar cuttings and 2-year-old jack pine seedlings were used, the former as a background to act as a windbreak and the latter both to break the wind and hold back the sand.

Spruce Budworm Infestation Attacked by Airplane

In the summer of 1927 the Canadian Department of Agriculture made a trial of the spreading of poison dust by airplane as a method of controlling the spruce budworm. The scene of the experiment was an area near Orangedale, Cape Breton Island, where a spruce budworm infestation dating probably from 1915 reached epidemic proportions within the last four or five years. The equipment was similar to that used in dusting cotton fields of the South with boll-weevil poison. Dusting was done in the early morning usually between 4 and 7 a. m., and in the evening, because at other times the air was not sufficiently calm. It was believed, also, that the dew and the moisture in the air in early morning would cause a greater amount of the dust to stick to the needles. The plane was flown at heights of from 10 to 40 feet above the tree tops. The kinds of powder and the poundage per acre that were tried, on plots from 800 feet to 2 miles long and from 200 feet to one-quarter mile wide, are the following: Calcium arsenate, 10, 15, 20, 30; lead arsenate, 15, 30.

The main purpose of the experimental work thus begun is to determine if possible the most effective kind of poison, the most effective poundage per acre, and the lowest poundage per acre that will kill the caterpillars.

Notes on the Oxford Forestry Tour of 1927

By A. F. Hough, United States Forest Service

In management plans for the forests of France and Germany the present trend is toward greater elasticity. Experience has shown that working plans covering long periods of time can not in any event be followed out exactly, chiefly because of accidents such as wind damage that cause the reproduction of certain periodic blocks in advance of the planned date. Consequently more responsibility is being laid on the forest officer in charge of a given area and more dependence placed on his experience and judgement as to the treatment of his forest. This is made possible by the fact that in these countries there are many forest officers who have had long experience in producing forest crops on given areas.

Four State forests in western France that are managed under the "uniform" or shelterwood compartment system, with fixed periodic blocks, were visited by the men who participated in the continental tour of the Oxford Imperial Forestry Institute last summer. These included Rouvray in the Department of Eure, Perseigne and Belleme in the Department of Orne, and Berce in the Department of the Sarthe. On these forests management plans are applied with much less rigidity than in the past. Regulation of yield is by area and volume, annual coupes or felling areas being selected by the divisional forest officer and approved by the conservator. The yield for the next 10-year period is calculated for each periodic block through an enumeration of the growing stock. No account is taken of the increment expected during the period of cutting. Any balance from the previous period is added. A fixed annual yield is determined by dividing the total volume for the periodic block by the number of years in the period. Volume tables based on diameter and height are used in the work of estimating the yield, separate tables being prepared for each felling series or even for each compartment.

In certain State forests of Germany a more elastic system has been adopted with success. Estimates of the yield are made at intervals of 20 years and are revised after 10 years. It goes without saying that cutting is on a sustained yield basis and that very good markets exist for all forest products. The amount to be cut during each 10-year period is influenced by the growth obtained and by the desirability of maintaining or working toward a normal distribution of age classes.

On the Schifferschafts forest in Baden, Black Forest, Bavaria, Oberforstrat Stephani, having demonstrated the soundness of his knowledge of silviculture, is permitted to decide on his own initiative what part of the volume of timber to be cut within the 10-year period shall be removed in any given year and in which part of the forest the cutting shall be made.

On this forest Herr Stephani has developed uneven-aged stand of silver fir and spruce, wit mixture of beech. His idea is to aid the larger l formed, vigorous trees to become wind-firm an produce high increment by favoring them in his t nings. At present there is a preponderance of older age classes (69 per cent) owing to exploita over large areas in the eighteenth century. Arti reforestation began early in the nineteenth cent Reproduction comes in naturally and is obtaine different systems, e. g., the group system, the system, and the shelterwood compartment system

On the whole, all the foresters with whom cont were made are agreed as to the advisability of ducing mixed rather than pure coniferous forests the purpose of bettering the soil and increasing yi Examples of the introduction of an understor beech (*Fagus sylvatica*) into forests of Scotch were seen in France and in the Rhine Valley fo near Darmstadt and Mannheim, as well as in Bav Of course the forests of Pinus maritima along French coast are purely pine.

In the oak-beech forests of central France and ir maritime pine region, reliance is placed largely natural reproduction. Planting is resorted to onl the event of a failure or for the introduction of con on certain poorer sites in the French oak-beech for It was noted, by the way, that on poor oak sites growth of silver fir (*Abies pectinata*) is more rapid that of the oak and beech. There are, however, tain exceptions to the rule that natural reproducti being relied on to a greater extent than previo In the case of the Scotch pine forests of the R Valley, established by artificial means on shifting and heath lands, a problem has arisen in conne with natural regeneration. This is known as "race" problem, and is the result of the formerly understood fact that there is such a thing as her in trees. In planting these forests, seed from wind-blown, twisted coast trees of Denmark and places along the Baltic was used, because of its ch ness. The progeny of these trees has exhibited the third generation the characteristic twisted for the parents. This has necessitated expensive p ing. Another reason for the practice of artificia generation in the Rhine Valley is the necessity intensive use of land to support the dense popula For two years after the forest is cut potatoes are r between the rows of planted pine seedlings.

In the Spessart oak forest, it is desired to prod dense and fairly even-aged stand so that the trees grow tall and straight and form narrow growth suitable for high-class veneer stock. Natural r duction is not relied on to establish the thick, cro stand required during the first 50 or 60 years o rotation. Here a "ladder" type of sowing is seed spots being laid out in the form of parallel with connecting cross bars. Older beech trees left to protect the young seedlings from frost, oughout the 300-year rotation beech is kept in the nd as a trainer to cause the oak to develop tall, ight, symmetrical boles, though several rotations of shorter-lived beech may be required for this pose.

nother exception to the use of natural reproduction seen in the spruce forests of Bavaria, into which ch and silver fir must be introduced artificially, n under fence to avoid damage by deer.

rplanes and Smoke Candles for Combating Forest Insects

n a spruce forest in Czechoslovakia visited during past summer by Dr. L. O. Howard of the United tes Bureau of Entomology, an area badly infested h the nun moth is narrowly divided from one on ich the infestation has been checked. This forest sists of three separate properties, owned by the vernment, a private landowner, and a neighboring y. When the proposal was made in a previous son to combat the nun moth by dusting the forest h poison through the use of an airplane, the city used to join with the Government and the private ner in this measure. Doctor Howard found the tions that had been dusted in thriving and healthy dition. The municipal forest has been so devas- ed by the insect that the timber will have to be t and sold for paper pulp at an unsatisfactory ce.

A new style of chemical attack on insect pests hich Doctor Howard saw being tried in Europe has en developed by chemical warfare technicians. e materials used resemble somewhat the "smoke ndles" used in war time to generate a smoke screen. e fumes contain arsenic. In some places the arsenic mokes" are set at intervals on the ground, in others ey are carried through the grove or orchard on long les by a rank of men. In either case they fill the r with a white fog that takes about an hour to settle.

ommunal Forests Pay Good Dividends

Seventeen communes of the Department of the ude, in southern France, obtained a return of 285,000 francs from their communal forests in 1926. he average return was 2,000 francs per hectare. he village of Montfort, with a population of 490, ceived 247,200 francs from its woods. These com- unal forests are under forest management.

* * *

A consignment of 3,000,000 feet of Russian redwood nd whitewood from Archangel arrived recently at rovidence, R. I., on the Norwegian freighter *Wilfred*, o be handled by the Soviet Government's New York gency.

Forestry Prizes Offered by Touring Club of France

To encourage reforestation the Touring Club of France is offering a series of prizes in medals of honor and cash. A prize valued at 5,000 francs will be given each year for outstanding work in the establishment and maintenance of plantations. Six prizes of a total value of 10,000 francs (cash and medals of honor) will be given for establishing plantations, three to communes, forestry associations, or other organizations, and three to individuals. Prizes of lesser value amounting in all to 10,000 francs will be distributed during the year at tree celebrations, forestry meetings, and other gatherings for reforestation work and for propaganda and advisory work leading to reforestation. In awarding the prizes special consideration will be given to the conditions under which the work is done, the difficulties overcome, and the usefulness of the plantations. The more important prizes will be awarded for reforestation within groups of departments designated in advance and will be rotated from one group to another.

Twisted Fiber in Pinus Longifolia

Sowings of Pinus longifolia Roxb. established in Kumaon, India, for investigations into the origin of twisted fiber were reinspected in October, 1926, by Silviculturist H. G. Champion. Mr. Champion's conclusions at that time, which harmonize with those he reached after inspecting the sowings in 1923, are stated in the Indian Forester as follows:

"Sowings of seed of known parentage have demonstrated clearly that spirally twisted fiber in Pinus longifolia in Kumaon is inherited from the parents. Seedlings of all ages up to 10 seasons (excluding one season old plants) exhibit a percentage of twisted stems and a degree of twist proportional to that of the parent crop from which they are derived. This result is obtained with protection from all the ordinary forms of damage, showing that the latter can not be the immediate cause of twists. It has also been shown that coppicing once or twice by fire or other means does not appreciably alter the proportions of straight and twisted plants.

* * *

The fund contributed toward a memorial to Sir William Schlich is to be used in establishing a forestry scholarship at Oxford University. It has been proposed that the scholarship be awarded in rotation to residents of Great Britain, the British Dominions and Colonies, and the United States. In reply to a request from the committee in charge of the memorial for suggestions from American foresters the executive council of the Society of American Foresters has suggested that the scholarship should be open only to graduates in forestry, and has stated that the plan of rotation is satisfactory and particularly generous to the United States.

Personals

Louis S. Nagler has accepted appointment as conservation director of Wisconsin.

C. J. Telford has become extension forester for the State of Illinois. During several years' service with the Natural History Survey of Illinois Mr. Telford prepared a survey map of the State showing its forests and important forest planting regions, and made an extensive study of farm woodland management the results of which have been published in several booklets. Mr. Telford was graduated from the Yale Forest School with the class of 1915.

J. G. Lee, sr., for many years head of the forestry work of the Louisiana State University, has been transferred to the university's extension department as extension lecturer in forestry. Professor Lee's successor as head of the forestry department is G. D. Marckworth, who came to the university two years ago as associate professor of forestry. Professor Marckworth holds forestry degrees from Ohio State University and the Yale Forest School, and has served with the State forestry organizations of Virginia, Texas, Tennessee, and Maryland.

Joseph A. Gibbs, junior forester in charge of the Gladwin Nursery, on the Monongahela National Forest, has accepted appointment as extension forester for Connecticut and instructor in the Connecticut Agricultural College. Mr. Gibbs is a graduate of the Colorado State College, and in 1927 received the degree of master of science in forestry from the Iowa State College.

Fred B. Merrill resigned as State forester of Kentucky on November 15 and has accepted appointment to the staff of State Forester Lufburrow, of Georgia. Mr. Merrill is now engaged in developing cooperative forest fire control activities in south Georgia. His headquarters are at Albany, Ga.

Carl P. Fatzinger has been appointed assistant State forester of Delaware. Mr. Fatzinger is a graduate of the Pennsylvania State Forest School and of the Yale Forest School.

G. H. Lentz, professor of forestry extension and director of the summer camp of the New York State College of Forestry, is on leave of absence this year. He is now working on a study of the bottomland hardwoods in the South, under a cooperative arrangement between State Forester W. R. Hine of Louisiana and the Southern Forest Experiment Station.

Arthur P. Kelley, assistant professor of bo
in Rutgers University, has accepted appoint
as forest ecologist at the Allegheny Forest Ex
ment Station, Philadelphia, Pa. Doctor Kelley
educated in the University of Pennsylvania, speci
ing as an undergraduate in biology and botany
later receiving the degrees of master of arts and d
of philosophy for work in morphology, taxon
physiology, and ecology. After a short perio
teaching in the botany department of that unive
he became an instructor in botany in Rutgers Co
in 1922. He has published many papers in the
of ecology and soil science.

H. G. Lachmund, in charge of blister rust co
work of the Bureau of Plant Industry in the P
Northwest, is to succeed John S. Boyce as head o
bureau's Portland, Oreg., office of forest patholo

In memory of Frank A. Fenn the United S
Geographic Board has named Fenn Mountain i
Bitterroot Range in northern Idaho. Fenn Mou
lies within the Selway National Forest, not far
the city of Kooskia. Major Fenn was superinte
of forest reserves for Idaho from June, 1901,
the Forest Service was organized, when he be
supervisor of the Sawtooth National Forest.
he was successively in charge of the Bitterroot, C
water, Selway, and Flathead National Forests,
from 1915 to 1920 he served as assistant district fo
of the northern national forest district.

Don M. Matthews has joined the faculty o
School of Forestry and Conservation, Universi
Michigan, as professor of forest management.
retains a consulting connection with the Tr
Plant Research Foundation and with the U
Fruit Co.

George F. Rupp, a member of the 1926 class
Yale Forest School, has left the faculty of the fo
department of the Pennsylvania State College to
forestry in the University of the South, Sewanee,
He is succeeded by Claude E. Sutton, forme
forest examiner on the Lolo National Forest.

Dr. L. O. Howard has retired as chief of the U
States Bureau of Entomology, after 33 years of s
in that position. He is succeeded by Dr. C. L. Ma
who for the past five years has been associate ch
charge of the regulatory work of the bureau, an
chairman of the Federal Horticultural Board.
Howard remains a member of the bureau but will
after devote himself entirely to research.

. T. Worthley has resigned as assistant forester of Pennsylvania Railroad, after serving in that acity for 15 years, and will engage in research and sultant work at Phoenixville, Pa. He is suc- ded by A. P. Wood, who, since graduation from the le Forest School in 1920, has been employed by the road as a forest inspector.

amuel J. Record, professor of forest products in Yale Forest School, has been appointed research ociate in wood technology in the department of any, Field Museum of Natural History. Professor cord expects to spend a month of his summer vaca- n at the museum, as he did last year, assisting in the tallation and rearrangement of wood exhibits.

. G. Schnur, junior forester on the Sitgreaves tional Forest, has been transferred to the Allegheny rest Experiment Station, Philadelphia, Pa. Mr. nnur is a member of the 1926 class of the Yale rest School.

P. M. Barr has been placed in charge of the research work of the forestry organization of British Columbia, succeeding J. L. Alexander, now assistant professor of forestry at the University of Washington. Mr. Barr is at present enrolled in the Yale Forest School as a candidate for the degree of doctor of philosophy.

Charles H. Flory, district forester of the Alaska National Forest District, has been designated by the Secretary of Agriculture as a commissioner for Alaska, under the recent act of Congress that authorizes the Secretaries of the Interior, Agriculture, and Commerce each to designate an employee of his department stationed in Alaska as an ex officio commissioner.

Recently elected officers of the North Carolina Forestry Association are C. J. Harris, Dillsboro, president; R. B. Robertson, Canton, vice president; R. W. Graeber, Statesville, secretary; W. J. Damtoft, Canton, treasurer; and Joseph Hyde Pratt, Chapel Hill, chairman of executive committee.

Bibliography

ew Reference Book of Forest Statistics

In "American Forests and Forest Products," De- rtment of Agriculture Statistical Bulletin No. 21, e Forest Service has assembled on 320 pages the tistics for which it has the most frequent calls from esters, economists, Federal and State officials, and her inquirers. Hundreds of tables are presented der the following group headings: (1) Forest statis- s of the United States; (2) national lumber tables;) State tables of lumber production; (4) lumber oduction of principal kinds of wood; (5) pulpwood, od pulp, and paper statistics; and (6) minor forest oducts and wood preservation. The statistics ven are based on data collected by the Forest Service, e Bureau of the Census, the Bureau of Foreign and omestic Commerce, the Bureau of Agricultural onomics, and other organizations.

Tables on State lumber production in all but four the States were newly compiled for this publication. e showing of lumber production by kinds of wood, vering 13 of the most important woods, is the first ch compilation that has been published, so far as is own by the Forest Service.

An important new feature of this bulletin is that it esents a cumulative record. Sections 2, 3, 4, and 5, particular, not only give figures for present condi- ons but make an exhibit of Government records on eir subjects as far back as the records extend.

Copies of this bulletin can be obtained from the uperintendent of Documents, Government Printing ffice, Washington, D. C., at 45 cents each.

Report on Study of Selective Logging in the Lake States

An advance report on the study of the comparative advantages of selective and clear cutting on four operations in the northern hemlock-hardwood forest of the Lake States has been published cooperatively by the Northern Hemlock and Hardwood Manufacturers' Association and the United States Forest Service. The study was made by Raphael Zon and R. D. Garver of the Forest Service.

The report brings out strikingly the advantages of cutting only the larger trees. For the operation studied the highest profit per 1,000 board feet was obtained when trees were cut to a diameter limit of 18 inches. Cutting to this diameter limit leaves 41 per cent of the original volume of timber standing and provides for a second cut of large timber within a reasonable time. Even if the desire is to remove in one logging all merchantable timber it does not pay to cut trees below 12 inches in diameter; for below that limit money is lost on the operation. It is not recommended that the operator cling to a rigid diameter limit, but rather that the diameter limit be used as a guide and judgment used in cutting above or below it on the basis of soundness and form of the timber, danger from windfall, and the needs of the young growth. Selective logging takes the greatest value from the stand with the least volume, and in large measures solves the problem of the small log.

The advance report outlines the method and result of the study and gives tables of costs, overrun, lumber grades obtained, effects of cutting to different diameter limits, comparative value of timber at different diameter limits, and value of logs of different sizes and species.

A few copies of this report are available for free distribution and may be obtained from the Director, Lake States Forest Experiment Station, St. Paul, Minn.

Illinois Tree Guide is Popular

A new edition of 10,000 copies of "Forest Trees of Illinois: How to Know Them" is being distributed by the Illinois Department of Conservation. The first edition, of the same number, was exhausted within a few weeks of its appearance in the past summer. The booklet was immediately adopted by the University of Illinois for use by the departments of botany and landscape engineering. Large numbers of copies were requested by colleges, high schools, and grade schools, and by clubs and county agricultural agents. A Chicago information bureau and a Chicago newspaper asked for 1,000 copies apiece, and a nursery company wanted several thousand to distribute among its customers.

This tree guide booklet, prepared by W. R. Mattoon, extension forester of the United States Forest Service, and R. B. Miller, State forester of Illinois, is the fourteenth sister in the family of State tree guide booklets that have been written by Mr. Mattoon either alone or with local collaboration. The States for which guides have been published are Connecticut, Delaware, Maryland, the District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Florida, Illinois, Kentucky, Tennessee, Arkansas, and Mississippi.

Map of Mississippi Basin Published by Geological Survey

A base map of the Mississippi River basin suitable for use in showing plans for flood control has been prepared by the Geological Survey, Department of the Interior. The map covers a region about 900 miles long and 600 miles wide, extending from Dubuque to the Gulf and from beyond Omaha, Tulsa, and Houston on the west to Chicago, Evansville, and Tuscaloosa on the east. The scale is approximately 16 miles to the inch. Copies of the map may be obtained from the Geological Survey, Washington, D. C., at 50 cents each.

Topographic Map of the Grand Canyon

A topographic map of the Grand Canyon National Park, Ariz., has been prepared by the Geological Survey in cooperation with the National Park Service. Drawn on a scale of about three-fourths of a mile to the inch, the map is 43 by 80 inches in size, and it is printed in three colors. Copies are sold by the Geological Survey, Washington, D. C., at 50 cents apiece.

Timber Growing in the Western W Pine and Larch-Fir Forests of Northern Rocky Mountains

"Timber Growing and Logging Practice i Western White Pine and Larch-Fir Forests c Northern Rocky Mountains" has been publish the United States Forest Service as the fourth b in a series dealing with the principal forest regi the United States. On the basis of several study the authors, Elers Koch and R. N. Cu ham, predict that if logging in northern Idah western Montana continues at the present rat lumber production of this region will be greatl tailed within 30 years. Whether the resultan back will be permanent, they say, depends on sort of treatment is given to the remaining stan the areas that have been cut or burned over. measure most necessary for keeping forest la this white pine and larch-fir region product adequate protection from fire, and protection fire is largely a matter of slash disposal. Recomm tions are made as to methods of disposing of sl each of the two forest types, and as to other me for fire protection. Attention is drawn to the of the second-growth timber from 10 to 40 yea that now covers large areas in north Idaho and potential value of the timber of less desired s which the loggers now leave in the woods, b which are now imperiled by frequent fires. additional means of insuring future timber su selective cutting of mature trees is advocat uneven-aged stands; and for even-aged white stands, leaving from two to six sound and seed trees per acre.

Copies of this publication, Department of culture Bulletin 1494-D, may be obtained w charge so long as the supply lasts by writing Forest Service, Washington, D. C.

New British Journal

The recently organized Society of Foresters of Britain has published the first number of its j under the title "Forestry." It is intended th journal shall carry the results of practice and re in both timber growing and utilization. Th number includes 16 articles and 7 reviews, and pages in length. The editor is H. M. Steven, I Forestry Institute, Oxford.

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The Louisiana Department of Conservation sumed publication of the Louisiana Conse News, discontinued in January, 1925. The " reappears as a printed magazine of 16 page purpose is to help the six divisions of the depa keep up with the news of each other's work carry this news to interested persons and or tions both in Louisiana and elsewhere.

Western White Pine Yield and Volume Tables

Yield and volume tables for the western white pine pe in the Northern Rocky Mountain Region, prered by I. T. Haig, assistant silviculturist of the orthern Rocky Mountain Forest Experiment Staon, have been mimeographed for preliminary distrition. With the 34 tables are included a method for e application of normal yield tables and a site classiation chart for western white pine stands. Secondowth volume tables are given for western white pine d the associated species. The yield tables indicate e possible yield in board feet and cubic feet by site dices for stands from 20 to 160 years of age. In ldition the average diameter, number of trees, and sal area are given for stands of various ages.

These tables indicate that the second-growth estern white pine stands on the best sites produce ore than 1,000 board feet per acre per year. One tgrowth of the study on which these tables are sed is the discovery that within a small margin of rror the yields of individual western white pines are ractically unaffected by the constituency of the stand, rovided that white pine forms as much as 15 per cent the total number of trees on the area.

A limited number of copies of this report are available to the public. Requests should be addressed to e Director, Northern Rocky Mountain Forest xperiment Station, Missoula, Mont.

A Picture Book on European Forestry

An attractive booklet containing 132 well reproduced hotographs has just been issued by Nelson Courtland Brown of the New York State College of Forestry under the title "Camera Studies in European Forestry Practice." A short explanatory comment or legend ccompanies each photograph. There is no text; the ictures tell the story. It is a pleasure to look over the amphlet, and almost anyone can pick up interesting nformation without effort by a study of the pictures nd legends. Those wishing to obtain copies should ddress Professor Brown at Syracuse, N. Y.

Practical Suggestions on the Care of Shade Trees

In a 4-page leaflet entitled "The Care of Shade Trees: Cultivating, Watering, Fertilizing," City Forester O. C. Charlton of Dallas, Tex., tells property owners how to care for street trees planted for them by the city park department. Explaining that "with perhaps no exception, every street shade tree has a hard time," he gives simple directions, illustrated with diagrams, for supplying the trees with the necessities of life.

Second Edition of Forestry Handbook for Teachers

"The Forest: A Handbook for Teachers," Department of Agriculture Miscellaneous Circular 98, is now in its second edition of 10,000 copies. It is being sold by the Superintendent of Documents, Government Printing Office, at 30 cents per copy and at $37.50 per 500 copies. Several States have bought 500 copies apiece, for use in schools, and one State bought 2,000. The Northern Hemlock and Hardwood Manufacturers Association ordered 1,000 copies for distribution to teachers and schools in Wisconsin. State Forester J. S. Holmes, of North Carolina, has written to every high school in the State offering to supply a copy without charge.

Recent Books and Pamphlets

American Tree Association: Tree planting book. 40 pp. il. Washington, D. C., 1927.

Blake, Irving Hill: A comparison of the animal communities of coniferous and deciduous forests. 148 pp. pl., maps, diagrs. (Illinois biological monographs, vol. 10, no. 4.) University of Illinois, Urbana, Ill., 1926.

Chamber of Commerce of the United States, Natural Resources Production Department: Forest research a national undertaking. 13 pp.; Organizing communities for forest fire control. 36 pp. illus., charts, map.; Progress in commercial forestry. 18 pp. Washington, D. C., 1927.

Hong Kong Botanical and Forestry Department: Report for the year 1926. 16 pp. tables. Hong Kong, 1927.

Illick, Joseph S.: Common trees of Indiana. 111 pp. il.; Common trees of Massachusetts. 110 pp. il.; Common trees of Michigan. 108 pp. il.; Common trees of New York. 123 pp. il.; Common trees of Ohio. 108 pp. il. American Tree Association, Washington, D. C., 1927.

The State Forests of Pennsylvania. 60 pp. il., maps. (Pennsylvania Department of Forests and Waters bulletin 37, revised.) Harrisburg, Pa., 1927.

McCubbin, W. A.: White pine blister rust. 25 pp. il. (Pennsylvania Department of Agriculture bulletin, vol. 9, no. 8.) Harrisburg, Pa., 1926.

Richardson, Arthur Herbert: Municipal forests. 19 pp. il. (Ontario Department of Lands and Forests, Forestry Branch, circular no. 14.) Toronto, 1927.

Wirt, George H.: Lessons in forest protection. 46 pp. il. (Pennsylvania Department of Forests and Waters bulletin 35, revised.) Harrisburg, Pa., 1927.

Wyoming Agricultural Experiment Station: Trees on the farm. 4 pp. (Circular no. 20.) Laramie, 1927.

Articles in Periodicals

Empire Forestry Journal, 1927.—Soil organisms: the dependence of certain pine species on a biological soil factor, by S. L. Kessel, pp. 70–74.

Forstarchiv, November 15, 1927.—Zur stickstoffdüngung der fichtensämlinge unter besonderer berucksichtigung ihrer zeitlichen ausbringung, by E. Manshard, pp. 386–388.

Indian Forester, November, 1927.—Some defects in present forest policy, by H. G. Champion, pp. 634–642.

Journal Forestière Suisse, December, 1927.—Notes sur l'accroissement d'un magnifique peuplement d'épicéa sur le Mont Vuarat (Canton de Fribourg), by H. Badoux, pp. 281–285.

Journal of Forestry, December, 1927.—A new enterprise in forest tree breeding, by Lloyd Austin, pp. 928–953. The commercial practicability of sustained yield in northern hardwoods, by R. B. Goodman, pp. 954–965.

Journal of Heredity, September, 1927.—Possibilities of hybrid oaks, by H. Ness, pp. 381–386.

Lumber Trade Journal, November 1, 1927.—Small sawmill utilization of shortleaf pine, by R. D. Garver, pp. 40–41.

Michigan Agricultural Experiment Station Quarterly Bulletin, November, 1927.—Some results of the Michigan woodlot tax act, by Karl Dressel, pp. 59–63.

Pacific Pulp & Paper Industry, December, 1927.—Sensible timber taxation, by J. B. Fitzgerald, pp. 28–31.

Paper Mill and Wood Pulp News, December 3, 1927.—Natural reproduction of pulpwood, by George N. Ostrander, pp. 20, 22, 24.

Proceedings of the American Society of Civil E
neers, December, 1927.—Forest cover as a fact
flood control, by Edward F. McCarthy, pp. 2
2518.

Quarterly Journal of Forestry, October, 1927.—
choice of species, by N. A. Orde-Powlett, pp.
264. Hungarian forest policy, by J. Hunter B
pp. 269–275.

Science, August 26, 1927.—The emergence of
biology of forest and range, by Walter P. Ta
pp. 184–186.

Southern Lumberman, December 17, 1927.—The
ber industry of Finland, by Torsten Johansson,
223–225. Shortleaf pine, by B. Greaves, pp.
298.

Tropical Woods, December 5, 1927.—Compara
anatomy of the woods of the Juglandaceae,
David A. Kribs, pp. 16–21.

U. S. Department of Agriculture Journal of Agr
tural Research, October 15, 1927.—Form-class t
curves and volume tables and their application
C. Edward Behre, pp. 673–744.

West Coast Lumberman, December 1, 1927.—
invention measures moisture content, by E.
Hayes, pp. 28–30.

Zeitschrift fur Forst-und Jagdwesen, June–
1927.—Ueber den einfluss verschiedener wal
stände auf den gehalt und die bildung von nitr
in waldböden, by Antonin Nemec and Karel Kv
pp. 321–352, 385–412.

Recent Publications of the Forest Serv

National Forest Map Folders: Plumas, Lincoln, S
Barbara.

National Forest Administrative Maps: ¼-inch,
fornia, Bitterroot, Gallatin, Mono, and Stanis
½-inch, Shasta, Lolo, Natural Bridge.

National Forest Atlas Folio, on scale of 1 inch=1
Lolo.

U. S. GOVERNMENT PRINTING OFFICE:

FOREST WORKER

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Announcements

Central States Extension Foresters to Meet in Urbana

Extension foresters of the Central States will meet at Urbana, Ill., for a three-day conference beginning May 22. Talks on various phases of forestry extension work will be given by officers of the Extension Service in Washington and by extension foresters of seven States.

Science Meeting at Flagstaff

The eighth annual meeting of the southwestern division, American Association for the Advancement of Science, will be held in Flagstaff, Ariz., April 23–26, 1928. There will be sections on the biological, physical, social, and medical sciences and on education. In the general sessions and in the section on biological sciences it is planned to have a number of forestry papers. Officers of the committee arranging for the biological sciences program are Dr. J. J. Thornber, Tucson, chairman, and Dr. W. G. McGinnies, Tucson, secretary.

International Entomology Congress at Cornell

The Fourth International Congress of Entomology will be held at Cornell University, Ithaca, N. Y., during the week of August 12–18, 1928. Dr. L. O. Howard of the United States Bureau of Entomology will preside at the meetings. In the section of applied entomology two half-day sessions will be devoted to forest entomology. A number of European forest entomologists are expected to attend.

The former sessions of the congress were held at Brussels in 1909, at Oxford in 1912, and at Zurich in 1925.

Meeting of Meteorological Society

The spring meeting of the American Meteorolo
Society will be held at Washington, D. C., on Sa
day, April 28. It is understood that several pa
on forest fire weather will be presented. Paper
be presented at this meeting should be called to
attention of the secretary, Charles F. Brooks, C
University, Worcester, Mass.

Forestry Fair at Waycross, Ga., in S tember

The second annual forestry fair in Waycross,
will be held September 19–22, 1928. All timber ow
of Georgia, South Carolina, Florida, Alabama,
other States in the pine belt are invited.

American Forestry Association Tour Europe

A forestry tour of Europe has been arranged by
American Forestry Association for the summer of 1
It is planned to sail from New York June 30 an
return September 8. The itinerary includes Swe
Finland, Germany, Switzerland, and France. Arra
ments can be made for extension trips to Engl
southern France, and Italy. The price, exclusiv
extension trips, is $1,065. The tour is open to
men and women and is not restricted to membe
the association. A printed description of the tour
be obtained from the American Forestry Associa
Lenox Building, Washington, D. C.

* * *

The annual meeting of the National Lumber M
facturers' Association will be held at the Con
Hotel, Chicago, May 1 and 2.

Because the free edition of this periodical is necessarily limited, it can be distributed without char
outside of the Government service only to such persons and organizations as State forestry and conserv
tion officials, State agricultural extension directors, faculties and libraries of forest schools, and forest
associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for
single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Pri
ing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

Material offered for publication in the Forest Worker should be addressed to the Editor, United Stat
Forest Service, Washington, D. C.

FOREST WORKER

shington, D. C. MARCH, 1928 Vol. 4, No. 2

State Forestry

rest Protection Progress in Louisiana

f the 3,074,753 acres of pine forest land in Louis- a that was covered by the State's fire protection tem in the year ending June 30, 1927, only 3.2 per t was burned over. In the same year, it is esti- ted, fires covered 18.3 per cent of the 10,500,000 es of similar land in the State that was not given anized protection. For the present fiscal year the tection area covers 4,000,000 acres, or about one- rth of the State's pine forest land. This area in- des portions of 22 parishes and of all sections of the te except the hardwood lands along the main rivers.

The forest protective work of the Louisiana division forestry is supported through dues paid by owners protected land, at the rate of 2 cents per acre per ar; through an allotment of Federal funds; and rough the State's severance tax on timber. Aside m their fixed contributions, cooperating landowners ve erected 15 fire towers, at an average expense of ,000 for each tower.

During the past 18 months 700 miles of telephone es have been erected by the State as part of the e-protection system, and in 1927 more than 4,000 iles of firebreaks were constructed. These fire- eaks are made by plowing two furrows about 50 feet art and burning the grass or litter on the intervening ace. The plowing is done with a "middle-buster." he firebreaks cost about $3.50 a mile in longleaf untry, and about $1 or $2 a mile more on mixed pine d hardwood land. The protection area is so broken p by these lines, together with roads and streams, at a fire can not ordinarily go beyond an area of 0 or 600 acres.

eforestation Bills Introduced in New York Legislature

A measure introduced in the New York State Senate y Senator Charles J. Hewitt proposes the creation of commission to investigate the State's reforestation roblem. The commission's special object would be o find how much nonagricultural land suitable for eforestation there is in the State, where it is, and how t is valued, and to work out plans for promoting and inancing the reforestation of such land. The commission would consist of two senators, two members of the assembly, and three other persons, appointed by the governor. It would have all the powers of a legislative committee, and a fund of $75,000 would be made available to cover its expenses.

A companion measure introduced by Senator Hewitt provides for a concurrent resolution of the senate and assembly looking to an amendment of the State constitution that would make possible a bond issue of $100,000,000. It proposes that this amount be made available at the rate of $5,000,000 annually for the next 20 years for the acquisition and reforestation of idle land. Under these activities would be included the establishment of forest nurseries.

A hearing on these bills was held in Albany, January 18, at which no opposition was developed.

Land Classification in Minnesota

A staff of 30 men has been put to work by the Minnesota Department of Conservation on the classification of State-owned land which was authorized by the legislature in 1927, and on which the department is to report in 1929. The object is to separate out from the lands suitable for agricultural use those that should be forested or reforested, and to collect information needed for successful handling of the latter. Areas will be classified as to their soil and topography and as to how much stone is present on them. Another factor to be considered is accessibility to roads, railroads, stores, and towns. Lands classified as agricultural will be divided into those immediately available for agricultural development and those that could be devoted to timber growing for a considerable period before being needed for agricultural use. For the forest land, data will be gathered on the amount of timber present, its age and condition, and any damage it has suffered from fire, insects, disease, or animals; the location of merchantable timber and conditions bearing on plans for cutting and removing it; and the character of reproduction. On the basis of this information a type map will be prepared for each section. In the coming summer data on age and growth will be collected.

The survey is expected to include also a study of the history of certain regions that have been settled and developed and then, when the timber was cut off, have been largely abandoned.

Three More States Cooperate in Fire Protection

Agreements recently signed by the State foresters of Illinois, Delaware, and Florida provide for cooperation with the Federal Government under section 2 of the Clarke-McNary law in protecting the forest lands of those States from fire.

West Virginia Improves its Fire Score

Hunters caused 36.3 per cent of the forest fires that occurred on protected land in West Virginia in 1927, the State conservation department reports. Fires on the protected area of more than 5,000,000 acres during the spring and fall fire seasons numbered 383. The average area burned over was 29 acres, as compared with 53 acres in 1926.

Every sawmill and every logging locomotive in the State were inspected during the year, and fires from these causes were materially reduced. Brush burning has lost its sinister leadership as a cause of forest fire since the department entered into a cooperative arrangement with farmers under which rangers supervise all brush-burning activities.

During 1927 the West Virginia fire protective organization was strengthened by the employment in the Pocahontas district of a full-time district ranger with technical training in forestry. Two steel fire towers were erected on new sites, and a third replaced an old tower; and 77 miles of telephone lines were constructed, bringing the commission's telephone mileage to more than 400.

* * *

Wisconsin had an unusually light forest fire season in 1927, with only 229 fires on about 8,000,000 acres of protected land. The areas burned averaged 53 acres per fire.

Each district ranger of Wisconsin has now been provided with a truck for carrying tools, water, and power pump, and emergency wardens throughout the forest protection districts have been supplied with boxes of tools.

* * *

The forest fire suppression work of the Michigan Department of Conservation was unusually successful in 1927, despite rather severe fire conditions. The average fire burned over less than 40 acres. One reason for the improved showing was that a new staff of assistants and inspectors was added to the State forestry organization and that an assistant district warden was appointed in each district exclusively for fire protection work. More than 100 fire towers were in operation in the State throughout the fire season.

New Protected District in New Yor

A new forest fire district adding more than 2,000 acres to the 14,000,000 already covered by the fo fire protective work of New York State has been es lished in Otsego, Chenango, Broome, and western D ware Counties. Together with considerable area highly developed agricultural land, this district incl vast tracts of forest land. Its need for better fo protection is intensified by the presence of a consi able body of second-growth forests and woodlands by the fact that its reforested area is rapidly increas

Changes in Clarke-McNary Inspect Districts

Changes in the districts assigned to inspector forestry work done by States, in cooperation with Federal Government, under sections 1–4 of the Cla McNary Act divide as follows the territory lying so of the Lake States and east of the western bound of Iowa, Missouri, Oklahoma, and Texas:

Gulf States district: The substitution of Arka for Missouri makes this district include the State Alabama, Mississippi, Louisiana, Texas, Oklahc and Arkansas. District forest inspector, C. F. Ev Headquarters: Customhouse, New Orleans.

Central States district: This new district incl Ohio, Indiana, Illinois, Iowa, Missouri, Kentu and Tennessee. District forest inspector, E. Mu Bruner. Headquarters: Louisville, Ky. (probabl the Federal Building).

Northeastern district: Maine, New Hamps Vermont, Massachusetts, Rhode Island, Connecti and New York. District forest inspector, C. Tillotson. Headquarters: French Hall, Amh Mass.

Middle Atlantic district: Pennsylvania, New Je Delaware, and Maryland. District forest inspe G. T. Backus. Headquarters: Atlantic Build Washington, D. C.

Southeastern district: Virginia, West Virgi North Carolina, South Carolina, Georgia, and Flo District forest inspector, S. H. Marsh. Headquar Harrisonburg, Va.

* * *

Forest fires in Maryland in 1927 were held to average of 19 acres, the lowest average recorded this State in any year. The previous low record 62 acres, recorded in 1919. The total acreage, also lowest of record, was 4,202. The number of fires ported, 227, was lower than in any year since 1

* * *

In 1927 the mildest forest fire season Minnesota experienced for many years gave the State a recor 507 fires burning an average of 58.6 acres each. the preceding 12 years the average area burned fire in Minnesota was about 350 acres.

Some Planting Experiments in Texas

Eighteen thousand seedlings were raised in the nurs- of the Kirbyville State Forest, Texas, for planting cut-over land within the forest during the past nter. Because of the scarcity of pine seed in the uth in 1926, longleaf was the only native pine grown. the hope of finding valuable fast-growing species t native to Texas that can be grown successfully ere, the State forest officers raised stock for a 1-acre t of each of the following species: Monterey pine, ritime pine, western yellow pine, Japanese red pine, panese black pine, Italian cypress, cedar of Lebanon, d deodar cedar. Other exotics that were raised in e nursery but did not grow large enough for field anting were Austrian pine, Himalayan pine, redwood, d Douglas fir.

This planting was made an opportunity for trying t different methods and different tools, to find which ll do the work most economically and most efficiently. ecords of the cost of the operation, covering seed col- ction and extraction, nursery work, and planting, ll be made available to farmers, lumber companies, d other tree planters of the State.

Studies are being made on the Kirbyville Forest of e possibility of reforestation by means other than anting. In 1925, when there was a fair crop of seed of ngleaf pine, trees were examined for production of nes and seed, and in 1926 a careful examination was ade for seedlings. Practically no seedlings were und, evidently because such quantities of seed were aten by birds and rodents. Seed production of 100 elected trees is now being recorded each year. In the pring of 1926, longleaf seed were sown broadcast over 5 acres of open land on the forest. Practically no eedlings resulted from this sowing, again probably ecause the seed had been eaten by birds and rodents. This experiment was repeated in the fall of 1927 to nd whether the fall is a more favorable season for irect seeding than the spring.

County Demonstration Forest on Cut-Over Land

A demonstration forest is to be developed by Santa Cruz County, Calif., on cut-over redwood land near he point where the State highway into Big Basin joins he San Lorenzo Canyon road. An area of between 5 and 20 acres has been leased to the county super- visors by the Santa Cruz Lumber Co. for 50 years at cost of $1 a year. The farm bureau forestry com- nittee of the county, headed by S. B. Hunt, of Scotts Valley, is in charge of the work. Six thousand trees, nostly redwood and Douglas fir, are being supplied by he State forest nursery and the Eddy Tree Breeding Station.

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The name of the Connecticut Forestry Association has been changed to Connecticut Forest and Park Association.

A State Forest Presented to Vermont

Nine hundred acres of land in Granville Gulf, Vt., has been presented to the State by ex-Gov. Redfield Proctor as a State forest. The land lines both sides of the Gulf Highway for nearly 6 miles. Nearly the whole tract is well-timbered with spruce and hardwoods. The deed prohibits the cutting of timber within sight of the highway, except occasional trees that might endanger travel. It bans commercial establishments or advertising signs, but would permit the establishment of a public camp out of sight of the main road. The forest will be known as the Granville Reservation.

This gift brings the total number of Vermont's State forests to 17 and their area to 32,435 acres.

Education the Keynote of Mississippi's First Two Forestry Years

The report of the Mississippi State Forestry Commission for the biennium ending June 30, 1927, the first years of forestry work by the State, is a record of strenuous activity in public education. The commission decided at the outset that the entire fund of $10,000 per annum provided for its work should be devoted in the first two years to an educational campaign. To this end, a State supervisor of forestry education was employed, the first district forester appointed was detailed to intensive work with the superintendent of education and county agent of Simpson County, and the educational work of the State forester's office was closely coordinated with the farm forestry program of the State extension forester.

Simpson County was the center of most intensive effort. Every community in the county and every white school were reached. Fourteen local fire-protective associations were formed. Encouraging results were obtained in the matter of fire prevention. During the year ending July, 1927, less than 1,000 acres were burned over in the county. Similar work has been started in other counties. "The plan is to intensify the work in the counties where it is already started and expand gradually to neighboring counties, instead of trying to arouse interest in isolated points over the State." All the schools of the State, however, were given assistance in introducing forestry into the curriculum and a text was prepared and distributed for the use of teachers in correlating forestry with geography, nature study, science, biology, botany, history, civics, agriculture, and English. The forestry law of Mississippi specifically directs that State and county boards of education provide for proper courses of instruction by textbooks or lectures on forestry.

❦

The American Legion's purchases of land for a Connecticut State forest, in the town of Barkhamsted, have grown to 320 acres. The 100 posts of the Legion in Connecticut are still collecting for this purpose, with the aim of making their gift an even 500 acres.

North Carolina Authorizes New Game Preserves and a Game Farm

A game farm from which North Carolina forests may be stocked with quail, pheasants, and wild turkeys is to be established in Randolph County, N. C., on a tract of land now included in the county farm, about 2 miles south of Ashboro.

Besides adopting this plan, the State board of conservation and development at its January meeting authorized the establishment of two new game preserves. One of these will cover between 8,000 and 10,000 acres of land on the Nantahala National Forest, Marion County. The chosen area lies along the watershed of Wayah Creek, about 8 miles west of Franklin, commencing at Arrowwood Branch. Some private holdings included in it will become part of the refuge, through agreement of the owners. The land designated for the refuge is almost entirely surrounded by national forest land on which hunting will be permitted. It now has a game population estimated at about 21 deer and three flocks of wild turkeys, and the board of conservation and development has appropriated $500 for adding to this stock of game.

The other new refuge will be the State's first quail preserve. It is to be located in Guilford County on land surrounding the municipal reservoir of Greensboro. Use of this land is being given by the city and by a number of private landowners under 10-year leases. Here it is planned to maintain 1,465 acres as a refuge and to have a much larger surrounding area available for public shooting grounds.

The second annual crop of forest planting stock the State Forest Nursery of Alabama, that of was shared by 237 landowners, and was several too small to fill all the requests received. The s most in demand were catalpa, black walnut, and locust. The trees were distributed in lots of frc to 500. In the present experimental stage of planting in Alabama the State forestry organiz does not advise heavy investments in planting.

◆

Forest planting in California made more progr 1927 than in any preceding year, State Forester reports, and brought the total of forest plantatic the State to 53,377 acres. Timber companies State reforested 7,616 acres during the year, with redwoods. Los Angeles County, by plantin acres, brought its total reforestation area to 1,873 planted mostly to Coulter pine. In addition t trees that were planted on State land, the State fo organization provided 12,450 for use by farme developing wood lots and windbreaks.

◆

The Pixley farm of about 216 acres in the Boonville Gorge, near Boonville, N. Y., is purchased by the State conservation depart for development as a public camp site. The far cludes the Pixley Falls, and more than half o covered with forest growth. It is crossed by the singkill stream, the Black River Canal, and the Boonville State highway. This site is farther than any of the camp sites yet established i Adirondack area.

Education and Extension

Forest School Conference at Berkeley

The forest school conference held in Berkeley, Calif., December 15, preceding the meeting in San Francisco of the Society of American Foresters, had an attendance of about 175. Delegates were sent by 14 schools. The men who joined in the conference included alumni of all existing forest schools in the United States and of three European forest schools. The discussions which occupied morning, afternoon, and evening sessions revealed a cross section of opinion as to the improvement of curricula and of the training of students to fit into present-day forestry conditions.

The district foresters of the Federal Forest Service who employ the greatest numbers of forestry graduates gave their views as to the qualifications needed for the immediate task in Forest Service work. A. S. Peck, district forester of the Rocky Mountain National Forest district, said that 16⅔ per cent of the technically trained men placed in ranger positions in his district had failed to make good, as against 8½ cent of the untrained men. On the other han per cent of the trained men are now considere advancement, as against 28 per cent of the untra The district foresters emphasized the fact that the who suits them best is not necessarily the man the best technical training, but the man in wh good fundamental training in forestry is united adaptability, a good cultural background, and a ce amount of administrative ability.

E. D. Merrill, dean of the Agricultural Colle the University of California, who is a member c committee on forest research of the National Aca of Sciences, informally discussed the committee's liminary report; and Dean H. S. Graves, of the Forest School, reported on a survey of forestry e tion in the United States which he has made in co tion with the work of this committee. Dean G expressed the opinion that the American forest s system is ill balanced in that too many of the sc trying to do practically the same thing. He called ntion to the fact that the United States has noth- corresponding to the so-called intermediate forest pols of Europe, unless in the single instance of the rth Dakota School of Forestry; whereas most of forestry positions in this country, particularly se in connection with the management of privately ned timberlands, are of an "intermediate" character.

A. Benedict, supervisor of the Sierra National est, expressed his belief that the usual four-year lergraduate forestry course hits between the two es of training that are most needed—a good voca- nal training for men to do routine work on the und, and a thorough training in research. Most of se who spoke on this subject dwelt on the difficulties the way of putting a curriculum of intermediate de into effect in any of the existing forest schools. veral pointed out that most of the students coming the forest schools are too ambitious to choose a irse of vocational rather than professional grade.

At Dean Graves's suggestion the conference expressed proval of the continuance by the National Academy Sciences of studies in the field of forestry education d plans for fellowships in forest research.

Forest Research Fellowships Recommended

By Ward Shepard, United States Forest Service

The forestry committee of the National Academy of ciences last autumn requested the Society of American oresters to prepare a detailed plan for the creation of esearch fellowships in forestry, with the expectation, the plan seemed satisfactory, of considering ways and eans of putting it into effect. A report indorsed in ecember by the society meeting and the conference f forest schools held in California was submitted to he National Academy committee in January.

The report recommends the creation of from 15 to 0 fellowships, for the training of research specialists n silviculture, forest products utilization, and forest economics, and in a few cases for the most advanced raining of picked men in the underlying sciences, especially plant physiology. The report recognizes the need for training men for research in practical methods of silviculture and utilization, and strongly stresses the need of advanced economic research, especially in the financial problems involved in reorganizing the lumber industry on a basis of perpetual operation.

The report clearly brings out the key position which research occupies in the forestry movement, and the necessity of fostering in research the best scientific traditions and practices. It also brings out the larger human implications of forestry, asserting that in no other way can man so profoundly modify the earth and its productivity as in substituting silviculture for forest destruction.

School Forest Given to Texas College

A school forest of 640 acres is being given to the Texas Agricultural and Mechanical College by John H. Kirby, president of the Kirby Lumber Co., Houston. The choice of a suitable tract from among Mr. Kirby's large holdings in eastern Texas has been entrusted to State Forester Siecke and the Kirby Lumber Co.'s land commissioner. In addition to serving as a forestry laboratory, Mr. Kirby foresees, the forest will provide the school with a considerable annual income. This, he stipulates, is to be used to create a student loan fund, preferably for students taking forestry courses, administered by the association of former students of the college.

Planning Windbreaks for Iowa Farms

"Shelterbelt schools" are being held in Iowa this season by Extension Forester Bode, to meet the increasing call of farmers for help in making plans for protection plantings. Each school is an all-day meeting. The morning is given to discussion of general phases of tree planting, and in the afternoon each farmer plots out his own farmstead and receives help in planning his windbreak. In February four meetings were held in each of three counties, and resulted in plans for plantings on 75 farms. The attendance, which included school children, totaled 272 and represented 34 townships.

All over Iowa, Mr. Bode says, windbreaks planted years ago are rapidly breaking down. Usually he recommends gradual replacement by planting one or two rows at a time. In order that the young trees may have enough sunlight and moisture it is advised that they be placed at least 20 feet from the old ones.

Mr. Bode has much to tell the farmers about the suitability of different trees for windbreak purposes. For most parts of Iowa, he says, the best choice is a combination of white pine and Norway spruce. Even without the help of the higher-crowned white pine the spruce can make a good windbreak, and for low ground or ground without good subdrainage it is the first choice. Still wetter ground calls for white spruce and white cedar (Arborvitæ), and where drainage is very poor it is best to use willow. Other trees recommended are Black Hills spruce, Austrian pine, western yellow pine, and (for the eastern and southern parts of the State) Douglas fir. For quick but temporary results Scotch pine may be used, and, on very sandy or gravelly soils, Jack pine. Broad-leafed trees that make good windbreaks if planted in large blocks are ash and poplar.

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An offer of $10 for the best original forestry slogan submitted is one of the devices of the Mississippi Forest Service for arousing interest in American Forest Week.

Camp Fire Girls Celebrate Tree Year by Planting

Two hundred thousand trees last year played the "lead" rôles in the Tree Year celebrations of Camp Fire Girls. In scores of communities scattered through at least 27 States the girls set out trees by ones, twos, hundreds, and thousands to make up this total. And planting the trees was not all of the job; for the girls raised the cash they needed for the work by devices such as candy sales, paper sales, banquets, plays, and movie shows.

In some cases trees were planted as memorials or for use as living Christmas trees. The girls of Tucson, Ariz., for instance, bought an evergreen for $10 and planted it in the city park to serve as a municipal Christmas tree. These girls realized that the planting was only the beginning, for they wrote to the New York headquarters of the organization "You may not know that this is a desert country and to plant and care for a tree is a big undertaking on account of the five months of intense heat and dryness."

Many plantings were for the beautification of school yards, parks, and other public grounds, and of roadways. Fifty trees were planted in a Sacramento schoolyard, 47 in a school forest at Hamilton, Mont., 100 on a school lawn of Selah, Wash. Staten Island girls made a Camp Fire plantation of 2,000 young spruce in a local public park. Ithaca, N. Y., girls planted 3,000 trees on the city watershed, under the direction of the forestry department of Cornell University and of the city forester.

Many groups planted their trees on their own camp grounds, or as Camp Fire groves. Girls of Latrobe, Pa., made a camp-ground plantation of 1,000 trees, under the direction of District Forester V. M. Bearer. Winnetka, Ill., girls, with some help from grown-ups who dug holes for the trees, made one day's work of planting 4,000 white pine and spruce furnished by the State department of agriculture. The especially ambitious program adopted by the Greater Boston Camp Fire Girls called for the planting of seven forests, each of 3,500 pine seedlings, dedicated to the seven points of Camp Fire Girls' Law.

Civic spirit was expressed in many of the Tree Year projects. Denison, Tex., girls, besides undertaking the care of the town's park and boulevards for the summer, held a sale of trees and shrubbery. Fort Worth girls took a tree census of City Park. Those of Sequin, Tex., made a tree survey to be used by the local chamber of commerce. St. Petersburg, Fla., girls decided on a campaign against wilful burning on city lots. In Palmerton, Pa., the tree commission of the borough council helped the girls draw up a plan for city planting, designating a special tree for each avenue, and made a tree map showing what property-holders had not planted trees. The girls undertook to interview each of these property-holders, and to provide them with nursery trees at wholesale prices.

That the girls did not mean to drop their active
est in trees at the end of Tree Year was sho
many acknowledgments of responsibility for futu
of trees planted and by the many progressive p
undertaken. Ten Middletown, N. Y., girls s
tree nurseries, each girl planting in her home
100 trees to be distributed a year or two later
farmers for planting in waste corners. Gi
Tuxedo Park, N. Y., started a tree nursery wit
cedars. In Columbia, Mo., Camp Fire Girls p
a potful apiece of Norway spruce seed given
State forester, planning to transplant the see
when they were a year old. Coffee Creek,
girls secured a deed to two lots and undertook
prove the land as a town park. Girls of Wayne
Ohio, got the board of education to turn over to
care an undeveloped 2-acre plot of school pr
which they proposed to convert into a park, and
of Pacific Grove, Calif., persuaded the city gover
to give them 1½ acres of land in the center of to
development as a park.

Some groups made the tree-planting a ceren
using a plan of exercises suggested by their cent
ganization; others made it a picnic. Numb
plantings took the form of Arbor Day celebra
Girls of Humboldt County, Calif., celebrated Li
Birthday by traveling out to a cut-over area ne
Carson Woods and planting there some 1,000 re
trees. Syracuse, Sandy Creek, and Phoenix,
girls camped over the week-end at the scene o
forestry labors, starting for camp after school on
and devoting Saturday to the planting of 1,50
under the direction of Frank W. J. McGibbon.
of Dallas, Tex., after meeting at 6.30 a. m. at
Gilliam's bird sanctuary and cooking breakfa
themselves, carried out their planting in a heavy
pour of rain. Hastings, Mich., girls hiked 4 mil
cooked a camp breakfast as preparation for plan
one day most of their quota of 2,000 trees.

New York Four-H Clubs Plant H Million Trees

Four-H boys and girls of New York State jum
the chance given them in 1927 by the State con
tion department to start forest plantations wit
stock. The department's offer to give 1,000
trees to any Four-H club member enrolled for fo
work was taken up by 500 boys and 48 girls. T
counties, instead of 10 as in 1926, took part
year's forestry club work, and the number of
planted by club members in the preceding yea
multiplied by five.

The plantings were managed with care. E
the young planters received an illustrated b
of planting directions specially prepared for F
club members, and county club leaders delivere
bundle of trees and personally supervised each pla

Members of the Unadilla club bought and su
16 acres of land for their planting.

ichigan Wants Forestry Material for Library

he School of Forestry and Conservation of the iversity of Michigan is to maintain its own library, arate from the main university library. The school l make a special effort to collect in its library his-ical documents, papers, books, and pictures per-ning to the lumber industry in Michigan. A gen-l appeal is made to all those who may have such terial to entrust it to the school.

he new library will be under the direction of Miss en Hoffman, who has had charge of the library and earch files of the Forest Products Laboratory, adison, Wis.

rboretum and Demonstration Planting at Lehigh

Lehigh University, Lehigh, Pa., gives no courses in restry, but it has an 18-year-old arboretum contain-g many varieties of forest trees and a demonstration rest most of which was planted 12 years ago.

In 1907, at just about the time when Dr. Henry urgis Drinker became president of Lehigh, the many estnuts that graced the university campus began to ccumb to the blight. The effort to save these trees, d later the problem of replacing them, greatly inten-fied Doctor Drinker's interest in forestry. Two ars later, largely owing to this interest on his part, 6-acre arboretum was established as an adjunct to the niversity's work in botany. The work was planned y Dr. Robert W. Hall, head of the university's depart-ent of biology. Five seedlings each of about 200 orth American tree varieties were planted in the hree-year period 1909–1911. Trees of every variety lanted have survived, and the arboretum now con-ains about 800 trees, many of which are from 30 to 40 eet high.

In 1915 the university began the planting of its emonstration forest, with the aid and advice of Dr. oseph T. Rothrock and Hon. S. B. Elliott. A 6-acre ract of hilly land having very poor soil, and unfavor-ably exposed, was chosen for the planting, in order to give students in the Pennsylvania forest schools an pportunity to study the growth of important native orest species planted on sites of this type. The area was divided into 23 plots, on which were planted 1 and 2 year old seedlings of 13 broad-leafed and 9 coniferous timber species. In 1919 the deciduous trees were severely injured by an attack of the 17-year locust. Most of the trees that died back to the surface of the ground as a result of this attack sent up strong shoots the following year, but some plots had to be replanted. At present, 12 years after the first plantings and five or, in some cases, six years after the replantings, the forest presents a very promising appearance, some of the pines and larches having reached heights of 20 feet or more.

A tree nursery dating from the time when the arboretum was begun is maintained in one corner of the arboretum plot to provide planting stock for the university's needs. All told, the trees that have been planted on the university's property number 111,680.

Practical Work by Four-H Clubs in East Texas

Thirty boys and six girls in the Four-H clubs of east Texas worked on forestry projects during the year 1927 under the direction of Extension Forester C. B. Webster. The children studied forestry lessons, gathered forest tree seed, collected and mounted forest tree specimens, and in many cases undertook to improve an acre of young pine forest. Charles Jameson, of Tatum, Rusk County, took charge of an acre of sweetgum thicket which he surrounded with a fire line, cleared of the worst of its brush, and thinned. With his labor charged at the rate of 30 cents an hour, the sale of fence posts and cordwood from the area brought in a net profit of $5. Charles A. Rowell, jr., a 12-year-old of Marion County, with the help of a younger brother worked an acre of young pine mostly just short of tie size. The labor in this case, at the 30-cent rate, represented an expense of $12.80, while the thinnings, worked up into fence posts, tomato stakes, and cordwood, had a value at local rates of $16.51. Madeline Lee, of New Hope, Rusk County, collected and mounted specimens from 84 different kinds of trees growing in the county, including in most of her mountings the leaf, fruit, and cross and tangential sections of the wood.

Through Four-H forestry club work Mr. Webster is endeavoring to teach the rising generation the wastefulness of certain practices in the treatment of forest land that are still current in east Texas. In parts of this region trees are still being poisoned and girdled to clear large areas of land for cultivation, while at the same time a large acreage of wornout land is lying idle. Fires, also, destroy much promising young growth as well as injure or destroy mature timber.

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Children in the public schools of Marion County, Fla., are to study reforestation and fire prevention for a period of 30 days, according to a resolution adopted in February by the county board of instruction. The study will be related to local conditions. It is to be introduced in as many classes and as soon as is practical. Approval of this plan has been expressed by the Marion County Chamber of Commerce.

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Arkansas women's clubs have begun to plant trees and shrubbery along the 56-mile concrete highway between Little Rock and Hot Springs. On the stretch of about 20 miles from Little Rock to Benton, local clubs have undertaken to plant 1 mile each.

Forest Service Notes

Effect of Pruning Douglas Fir Planting Stock

By Julius F. Kümmel, United States Forest Service

Douglas fir trees planted on the Snoqualmie National Forest in 1915 appear to have established themselves with greater success as a result of being "top pruned." The trees, transplanted at the end of the first growing season, were allowed to remain in the nursery for two years instead of the usual one year before being set out in the field. Consequently, when they were lifted from the nursery rows they had tops ranging from 12 to 26 inches in height and averaging 17 inches. Since 7 or 8 inches of root was as much as could conveniently be handled, the trees showed a very poor proportion between tops and roots. To overcome this, two lots of 50 trees each were pruned. In one lot the leaders were cut off; in the other, portions of the side branches only were removed. These lots of "leader-pruned" and "branch-pruned" trees, and a third lot of 50 trees that were left unpruned, were planted on adjoining plots on a gently sloping south exposure at an elevation of about 2,200 feet.

Comparison of the condition and growth of trees in the different lots, eliminating the influence of extraneous factors, was made on the basis of data for the first three years, the period that should bring to light any influence of top pruning on the survival of planted trees. Grade of thriftiness of living trees was arrived at by giving a relative weight of 3 to each tree classed as good, 2 to each classed as fair, and 1 to each classed as poor. Mortality per cent, degree of thrift, and growth in the three years were as follows:

Treatment	First fall			Second fall			Third fall		
	Mortality	Grade	Current height growth	Mortality	Grade	Current height growth	Mortality	Grade	Total height
	P. ct.		*In.*	*P. ct.*		*In.*	*P. ct.*		*Ft.*
Not pruned	0	93	3.3	0	72	6.5	4	83	2.4
Leader pruned	0	99	4.3	2	82	9.9	2	89	2.5
Branch pruned	0	98	3.8	2	90	11.4	4	91	2.9

The difference in mortality among the three plots was too slight to carry any significance. In thrift the pruned stock scored higher than the unpruned stock each year, no marked difference appearing bet the leader-pruned and branch-pruned lots. In rent height growth the branch-pruned stock led unpruned both in the first and in the second The leader-pruned trees can not fairly be compared the others in growth during these years; at this their upper branches were still contending for le ship, whereas in the other groups height growth concentrated usually in a single leader. In the year, when total height instead of current h growth was tallied, the branch-pruned stock still but the leader-pruned stock had overcome its fo disadvantage as compared with the unpruned s

The data consistently indicate that pruning of tops assisted trees in establishing themselves, alth not to the extent of causing a materially greater vival. These results do not preclude the possib that in the case of trees subjected to more unfavo conditions, such as adversity of site or of weather ditions in the first season, the greater thrift resu from pruning might definitely affect survival.

One objection to pruning coniferous stock has the possibility of producing permanently forked t Forked trees are sometimes produced in plantat made with unpruned stock and even in stands of nat reproduction, when the terminal buds or leaders ar cidentally injured. The occurrence of forked tre these plots is shown by the following table:

Percentage of trees without single leader at vario examinations

	1st fall	2d fall	3d fall	12tl
Not pruned	----------	46	32	
Leader pruned	----------	60	32	
Branch pruned	12	18	26	

Of the five trees in the leader-pruned lot that forked boles in the twelfth year after planting 2 forked at heights greater than those to which they grown when they were planted, which showed the forking was not due to pruning. One other close to regaining its normal shape through suppres of one branch. This leaves 2 trees, or 4 per cent, o leader-pruned stock that apparently will be per nently forked as a result of pruning, in comparison none in the branch-pruned stock. The one forked of the unpruned lot must of course have been inju

Just why this difference should appear in the twelfth ar, when forking was almost equally prevalent among e different lots in the third year, is not clear. Perps the explanation is that the artificial pruning was ore severe than that due to accident. Some evidence support of this hypothesis was noted in the appearce of the boles of several of the leader-pruned trees. ot only were 5 of these trees still forked in the twelfth ar, but 4 others had dead stubs protruding from the le at an acute angle and 2 others had a swelling on e bole at planting height, probably marking the point om which contending leaders had branched. Nothg of this sort was noticed in the branch-pruned or ununed lots.

Examination in the first year after planting showed at the rapidity with which a leader-pruned tree reined its normal form was considerably influenced by e position of the cut severing the leader. When the ut was made directly above a large lateral bud or a ngle vigorous lateral twig, a single leader formed uickly; but when it was made above a whorl of ranches of fairly equal size, each of these branches ndeavored to become the leader, and the restoration of e single-leader form was consequently delayed.

Although the tendency of leader pruning to produce small increase in the number of permanently forked rees may probably be lessened by care in locating the ut, branch pruning, which does not increase the number of forked trees and is equally effective with leader runing in facilitating establishment, is believed to e the better method.

A New Nursery for the Monongahela National Forest

By R. M. Evans, United States Forest Service

Anyone visiting the Monongahela National Forest this spring must be prepared to talk planting, for the interest of everyone on that forest is centered on the new tree nursery at Parsons, W. Va.

The planting job on the Monongahela is a big one. Thirty or forty thousand acres of the forest suffered greatly from fire while in private ownership. The first fires following the spruce cutting of early years destroyed the slash and reproduction. Subsequent fires continued the destruction until the once rich forest growth was replaced by blackberry vines. More fires, and even the vines gave way to the totally worthless bracken. These lands now bear almost no timber.

In 1919 the Forest Service established a tiny nursery at Gladwin, W. Va., to determine whether the site was adaptable for nursery purposes and whether planting was feasible on these deforested lands. In 1922 the first young trees were ready for planting, and 16 acres on Shavers Mountain was reforested to spruce. The Gladwin site proved to be well adapted for a forest nursery, and the capacity has gradually been increased to about 150,000 trees. This is too little to make much impression on the barren hillsides so much in evidence; but now, fortunately, increased appropriations for planting work have made possible a nursery program more in keeping with the Monongahela's needs.

Gladwin, ideal as to soil, lacks transportation facilities for the rapid and cheap distribution of large quantities of planting stock. So the National Forest Reservation Commission at its February, 1928, meeting approved the purchase of 28 acres just in the edge of the town of Parsons, and this tract is now being developed into an up-to-date nursery. Sufficient seed will be sown this spring to produce 1,000,000 trees, chiefly red and Norway spruce. About 100,000 white pine will be provided for, to plant old fields on the Shenandoah and Natural Bridge Forests. A little red pine, hemlock, white spruce, European larch, and southern balsam fir will be included for experimental purposes.

The expanded planting program for the national forests of the East, in which the Parsons nursery is the latest development, made good progress in 1927 with the establishment of nurseries on three forests. On the Lee National Forest, near Petersburg, Va., a nursery was started that after 1928 is to have a capacity of 500,000. Here loblolly and shortleaf will be grown to reforest the 3,000 acres or more of old farms and areas cleared for cantonment purposes. A nursery of similar size and purpose was started on the Jackson National Forest, near Columbia, S. C., for the purpose of raising longleaf and loblolly pine. The Ocala National Forest, on the Florida Peninsula, got an experimental longleaf pine nursery.

In the fiscal year 1929, or as soon thereafter as finances permit, the Forest Service plans to establish a nursery on the Pisgah National Forest, in North Carolina, to supply planting stock for the southern Appalachian group of forests, and one on the Ozark National Forest, in Arkansas, where many acres of old fields make no promise of restocking naturally within a reasonable number of years.

Central States Experiment Station Headquarters

Headquarters of the Central States Forest Experiment Station have been established in the Horticulture and Forestry Building, Ohio State University, Columbus, Ohio. The station is reached by taking a Neil Avenue car, and its telephone number is University 3148, Station 372.

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More than 24,000 hewn ties were cut in 1927 on the Walhalla-Westminster Working Circle of 50,000 acres on the Nantahala National Forest, North Carolina, from white and mixed oaks unmerchantable as saw timber and classed as "salvage."

Government Recovers Damages for Burned Young Growth

Damages of $12,674.14 for destruction of young forest growth by fire have been awarded to the Government in its case against the Feather River Lumber Co., tried before the United States District Court for the Northern District of California. The fire occurred on the Plumas National Forest, Calif., in August, 1924. Objection of the defendant company to the inclusion in the damages, which total $41,575.80, of the item for young growth was answered by the court as follows: "The Government is entitled to recover for the damage arising out of the destruction of young growth. The difference in the market value of the land before and after the fire is not available as a measure, since the national forest is not marketable. Reforestation cost is the proper basis for computing the loss."

The Government's right to recover the amount needed for reforestation of national forest areas on which young timber has been destroyed by fire has previously been recognized by the courts in one or two fire trespass cases. In the previous cases, however, the claim was never for so substantial an amount, and the decisions were not published.

Conservative Chipping Reduces Tree Mortality

In second-growth pine stands worked for naval stores by some of the more improved methods of chipping the annual mortality from turpentining averages less than one-half of 1 per cent. For second-growth pines used in the Starke, Fla., tests of the Southern Forest Experiment Station, losses by death were as follows:

Loss in second-growth longleaf and slash pine due to turpentining and other causes

Tract	Species	Number of trees in group	Duration of study	Average annual loss caused by		
				Turpentining	Insects	Lightning
			Years	*Per cent*	*Per cent*	*Per cent*
Sampson Lake	Slash	600	4	0.20	0.92	0.05
Powell	Longleaf	350	4	.42	.07	
Johns	do	212	[1] 1	.50	.50	.50
Do	Slash	50	[1] 1			

[1] Second year of working.

Experiments conducted at Starke have shown the slight injury caused to the tree by conservative working in contrast with the injury caused by severe methods that actually produce less resin over a period of years. From 1923 to 1926, inclusive, 600 slash pine trees on the Sampson Lake tract were worked with but one face to a tree, the width of the face being about 33 per cent of the tree's total circumference. At the same time 50 trees adjacent to and intermingled this group were worked with two faces to a tre faces having a combined width of 75 per cent tree's circumference. In the first group the s varied from one-fourth to 1 inch in depth and one-fourth to three-fourths of an inch in width; latter the streaks were one-half inch wide and on inch deep. Gutters in both groups were raise first three years of operation, and secured by ins them in broad-ax cuts. During the four years experiment the conservatively worked group sust only one-fortieth as much loss by death due to tu tining as the group severely worked. The percen lost through different causes are shown in the foll table:

Losses in second-growth slash pine severely and con tively worked over a period of four years (1923- inclusive)

Cause of death	Average annua	
	Severe working (50 trees)	Co t wo (600
	Per cent	*Pe*
Turpentining	8.00	
Insects	1.00	
Lightning		

Complete Victory Over Logging Eq ment Fires

Forest fire due to the operation of logging equip has for two years been an unknown occurrence as the national forests of Arizona and New Mexic concerned. To bring about this state of affairs officers of the Southwestern National Forest Di have spent many years' effort in building up observance of a code of preventive measures fo fire season. This code in the first place require use of fire-preventive devices on logging machiner the use of oil as fuel under all steam boilers. It f the moving of a locomotive while coals remain i fire box, when wood has been used to warm u engine. It requires that rights of way be cleane that fire-fighting tools be kept available for th of logging crews; that pumps and hose be carri all steam machinery and used to wet down a steam donkeys at set times; and that "sandin engines, to clear out the soot deposited in the tubes by the burning of oil, be restricted to along the railroads where the burning balls of soo the particles of hot glass sometimes thrown o engines during the sanding process will not start Above all, this freedom from fires caused by lo equipment means that a real will to prevent the been created among the loggers.

Elk Kill on the Absaroka National Forest, 1927

Hunters on the Absaroka National Forest, Mont., t year killed more than 1,500 elk. These elk had de themselves fair game by crossing over from the llowstone National Park, their sanctuary, into the tional forest during the elk-hunting season, October -December 20. The number of cows killed indicates at the majority of the hunters were out for a good ce of meat rather than for sport for its own sake. t as the kill represents about 400,000 pounds of meat d the elk were unusually fat, it may be regarded as much good meat saved; for even with the reduction numbers brought about by the hunting, some losses starvation are expected because of range overstocking. Most of the carcasses were taken out by automobile, many of them lashed to the running boards or front bumpers of passenger cars. About 800 elk were killed within a mile of the automobile roads, many hunters preferring to await their chance of a shot there rather than go 2 or 3 miles into the hills. No large slaughters occurred, because most of the elk crossed the "battle line" from Yellowstone Park at night and reached the hills north of Gardiner before shooting time in the morning, which was at 8 o'clock. A checking station was maintained cooperatively at Gardiner by the park service, the State game department, and the Forest Service. Patrols and hunting camps also kept a check. The total kill is reported as 1,506, of which 419 were mature bulls and spikes, 935 mature cows, and 152 calves.

General Forest News

ome Effects of Fire and Insect Attack on Shortleaf Pine

F. C. Craighead and R. A. St George, United States Bureau of Entomology

On a part of the Pisgah National Forest, N. C., hat was burned over April 2, 1925, Federal entomolo-ists and foresters have watched three years' progress f the injury suffered by shortleaf pines as a result f the fire and of subsequent insect attacks. A few ays after the fire a quarter-acre plot was established n the Bent Creek Experimental Forest of the Appa-achian Forest Experiment Station, in a fully-stocked econd-growth stand about 25 years old. The 514 hortleaf pines on the plot were tagged, and for each f these trees a record was made of the degree of fire njury and of certain tree characteristics. At the ame time a small square of bark at breast height was emoved from many of the trees to serve as a point of rientation and to facilitate checking of subsequent growth.

At the end of the third growing season after the fire 133 of the 514 trees were dead. This number represents about 18 per cent of the cubic volume of the stand.

Insects that have appeared in great abundance on the area are the southern pine beetle (*Dendroctonus frontalis*), which concentrated on the area apparently as a result of the fire; several species of engraver beetles (Ips); the pine sawyer (Monochamus); and several species of ambrosia beetles. The engraver beetles apparently had no influence on tree mortality. The wood borers and the ambrosia beetles served only as indications of the death of trees. Only one insect, the southern pine beetle, had an important part in the killing of trees. The death of 16 trees, dominants and codominants mostly in the larger diameter classes, was attributed to the work of this insect rather than to direct action of the fire.

Defoliation, attributable to the intense heat arising from the burning litter, was the type of injury most common among the 133 trees that died. On 99 of these trees, from 81 to 100 per cent of the foliage had been destroyed; on 26, from 61 to 80 per cent; on 7, from 41 to 60 per cent; and on 1 only, as little as 40 per cent. Of all the trees on the plot that were totally defoliated, 43 per cent have died. Thus it may be predicted that the mortality of defoliated trees will amount to 50 per cent.

Trees 2 or 3 inches in diameter, which in the absence of fire would gardually have been thinned out through competition, amounted to 78 per cent of those that died. Trees classed as suppressed made up 49 per cent of those that died and intermediates 25 per cent. Mortality of trees with diameters of 5 inches or more, or of trees classed as dominants, was in practically all cases attributed to the work of the southern pine beetle and not directly to injury by fire.

Measurement of the height to which the trees' stems were scorched brought out the fact that the greater number of deaths occurred among the trees least affected in this way. Of the 133 trees that died 40 per cent were charred to heights of 5 feet or less, and 25 per cent to heights of from 5 to 10 feet. The flames had reached from 10 to 15 feet up the stems of 18 per cent, and from 15 to 20 feet on the remaining 8 per cent. This evidence, coupled with that in regard to the fatal results of defoliation, clearly indicates that injury to trees by typical ground fires is a matter not of stem char but of the scorching of the foliage by heat that ascends through the crowns.

Other serious results of defoliation were manifested in marked retardation of growth and in reduction of the ratio of summer wood to spring wood. Measurements of more than 20 per cent of the dominant and codominant trees on the plot showed that the basal area increased 11.6 per cent in the three years preceding the fire but only 3.2 per cent in the three years following it. In the upper crown classes, also, 31 of the trees have failed for from one to three years to form an annual ring on the lower part of the stem. Since the fire no ring at all has been formed by 12 of the trees, only one ring has been formed by 10, and only two rings have been formed by 9. All rings formed since the fire show a much greater preponderance of spring wood over summer wood than rings formed before the fire. This change materially affects the density of the wood being laid on in the period of recovery from defoliation, which may extend to 10 years.

Another effect of defoliation, apparently correlated with the restriction in growth of summer wood, is a reduction in the number of resin ducts formed. Examination of increment cores showed that in the three years following the fire the trees have produced less than one-fourth as many resin ducts as in the preceding three years. A very large number of trees have formed no resin ducts whatever since the fire. If this failure to form resin ducts after fires which injure the crown occurs in longleaf and slash pines in the turpentining regions of the Coastal Plain as commonly as it occurs in shortleaf pine on the mountains, it undoubtedly has a very marked effect on their resin production for a number of years following fires. This applies particularly to second-growth stands in which fairly wide annual rings are being laid down and in which the usual chipping operations are not deep enough to cut into annual rings formed before the fires.

Porcupine Control Work on Two National Forests

Porcupine control work of the Bureau of Biological Survey on the Coconino and Tusayan National Forests, Ariz., in 1927 included the baiting of 1,374 dens situated within the summer range of the animals and the placing of poisoned bait at enough tree stations to bring the total of these stations to 677. The tree stations were located over a space of about eight miles, in lines at right angles to the line of porcupine migration.

For use in trees the bait, consisting of strychnine mixed with common salt, is placed in an improvised wooden cup made by boring a hole about 1½ inches in diameter and about 2 inches deep in a block of wood, usually a short piece of a 2 by 4. The cup is nailed to the trunk of the tree usually 8 or 10 feet from the ground, preferably about 8 inches above a large limb so "porky" can sit on the limb while he eats.

A check on 72 stations baited during the fall of and the spring of 1927 showed the remains of p pines at 32 of the stations and revealed plain evi of porcupine visitation at 28 of the remaining 40. latter fact suggests a casualty list much abov since past experimentation has shown that pred animals find and consume large numbers of dead p pines, leaving no trace of the carcasses except pos bunches of quills which may easily escape noti tall grass.

The baiting of tree stations as a method of contr porcupine infestation was suggested by the disc that the seasonal migration of porcupines follows well-defined routes and that individual trees w these routes are visited very frequently by the ani At present it appears to be a far more effective me than the baiting of dens.

Fire Stills for Naval Stores Converte Steam Stills

Turpentine and rosin stills of the old type, ope by fire, can be adapted to the use of steam thro method devised by J. O. Reed, associate engine the naval stores unit, Bureau of Chemistry and Studies by this organization indicate that the s still will produce a uniformly higher grade of than the fire still, and larger yields of turpentine that it will do the work with less fuel and more s and consequently at lower cost. Another very de advantage is the greater safety of operation o steam still, which is said to be almost foolproof.

The new improvement was tried out in the spri 1927 on the operation of the Newton Naval S Co., Mississippi. Since then the bureau has t out a patent on it, dedicating it to the public.

Steam stills have for many years been used success by the naval stores operators of France difficulty has been experienced in finding a ty steam still adaptable to American methods of han pine gum. In order to operate successfully the of steam stills that were previously tried out in country, it is necessary to heat and clean the gum before introducing it into the still. The u the new device permits the gum and the fin products to be handled in exactly the same mann in the still operated by fire, and necessitates no cl in equipment other than the still itself.

The operation of the steam still does not differ widely from that of the fire still. The heat to about distillation is obtained from a system of c coils placed inside the still in such a way that all is uniformly cooked. The coils are so arranged a to interfere with skimming or discharging the Live steam, brought in at the bottom of the ough a sparger, takes the place of the water usually into the still to carry over the turpentine. Steam ssure is maintained at 125 pounds during the run. am going into the still must be perfectly dry.

lue prints and specifications for converting fire s to steam stills are available to naval stores lucers on application to the Naval Stores Unit, eau of Chemistry and Soils, Washington, D. C.

Mixed Stands the Best Protection Against White Pine Weevil

By H. J. MacAloney, United States Bureau of Entomology

An extended series of experiments conducted by the rvard Forest and the Bureau of Entomology in the rtheast has convinced entomologists and foresters t the best and cheapest way to protect the northern ite pine from the weevil is to grow it in mixture h other species. The choice of the other species pends on conditions that vary with locality. Pref- bly, species of value in the final crop will be chosen, h as hemlock and the better hardwoods. In cen- l New England a mixture of white pine with hard- ods offers excellent protection from the weevil; but regions where the gypsy moth is abundant it is best avoid the use of hardwoods that may be subject to essive defoliation by this insect. Ash, sugar maple, d yellow birch are some of the better hardwoods at are not favorable food for the gypsy moth. In ler that the white pine may not be crowded out it necessary to weed the stand in the early stages, if e mixture is with hardwoods, and to thin it as it comes older.

In pure stands, whether natural or artificial, the eater the number of trees per acre the less will be e weeviling. Where weevil damage is a problem, it impossible to produce a dense pure white pine stand onomically except through natural reproduction and less the stand is sufficiently dense to offset any eeviling that may occur. Where site conditions and e degree of stocking are favorable for vigorous growth, od stands of pure old field pine occur commonly

Direct measures for controlling the white pine weevil, re generally too expensive for common practice. In oung stands that are isolated, that are only slightly fested, or that are specially valued for aesthetic asons, it is practical to remove the infested leaders or use sprays and repellants to prevent weevil attack. ime sulphur has been tried out with success as an nti-weevil spray.

Of 25 species of parasites bred from weeviled leaders offer some promise in reducing weevil infestation. owever, there are many difficulties in the way of reeding and liberating numbers of parasites sufficient o cause a material reduction of the numbers of weevil ven over a limited area, and the cost would be exces- ive. Still, it may be worth while when weeviled leaders are removed to place them in barrels screened with No. 12 or No. 14 mesh wire to allow the escape of the parasites.

Birds are evidently more valuable than parasites in controlling the weevil. On a northern white pine plantation of more than 3 acres at Petersham, Mass., 30 per cent of the weeviled leaders were stripped by birds and all the larvae destroyed. The birds actually observed feeding were the nuthatch, downy woodpecker, chickadee, and certain warblers. Protection of insectivorous birds is, therefore, important as a control measure. Wood mice and moles, also, undoubtedly serve to reduce the numbers of the weevil.

A New Forest Instrument

By Lester Reineke, United States Forest Service

The use of artillery seems to be responsible for the latest development in instruments for use in the forest. Long-range guns required the perfection of a range finder, and the newest forestry instrument is an adaptation of this military device. Though much smaller, in principle it is the same.

This instrument, the Fardi range finder, made by Leitz, is designed for measuring distances up to 50 and 100 yards, respectively, for the 20-centimeter and 40-centimeter sizes. It is accurate within 2 per cent at the maximum distances, and still more accurate at shorter distances. The range finder is a black tube, square in cross-section, equipped with a three-power magnifying eyepiece on one end, a fixed prism at the other, and a movable prism midway to which is attached a disk with a scale of distance. On looking through the eyepiece two images are seen, one yellow and the other white. By moving the circular disk the two images are brought into coincidence, and the distance can be read from the scale. The position of the instrument depends upon the object sighted on—if the object has horizontal lines the range finder is held vertically, if the object has vertical lines the instrument is held horizontally.

The measurement of distances is a common job in forestry. In mapping, cruising, measuring tree heights, etc., the range finder can often be used to advantage, particularly in fairly open country. It works less satisfactorily in very brushy places, or in dense young growth. On steep slopes it is of especial value in measuring tree heights, since the horizontal distance to the tree can be measured and no correction need be made for slope. In circular plots the distance from boundary to center can be easily checked.

In general, the range finder can replace the tape in many types of work in which very accurate measurements of distances are not necessary. It can not be used under all conditions, but for many types of work it will effect a considerable saving in time with no sacrifice of accuracy.

San Francisco Meeting of Society of American Foresters

The 1927 meeting of the Society of American Foresters, held in San Francisco December 16–17, attracted a larger attendance than any of the 26 annual meetings previously held by the society. The registered attendance was 254, of which number 159 were members of the society. Every important group in forestry was represented—Federal, private, educational, State, and county.

The outstanding feature of the discussions, introduced by President Wilbur of Leland Stanford University in the opening address, was a sizing up of the position of the Pacific coast timber resources with regard to the timber needs of the United States and of other countries bordering the Pacific. The problems of industrial forestry came in for a great deal of discussion.

An important feature of the meeting, which was the first the society has held on the Pacific coast, was a two-day field trip which included visits to the redwood forests of Humboldt County, Calif., and the logging, sawmill, and reforestation operations of the Pacific Lumber Co., at Scotia, Calif.

The meeting indorsed the program for fellowships for the encouragement of training in forest research that has been prepared by a special committee of the society at the request of the committee on forest research of the National Academy of Sciences. Approval was voted of the plan for a further study of forestry education outlined by Henry S. Graves at the conference of forest schools held in Berkeley December 15, and the president of the society was requested to take steps to secure financial support for such study and to organize a committee for the investigation if it can be financed. The meeting urged the necessity for a study of the problems of research in forest economics comparable with that recently undertaken in the biological phases of forestry by the National Academy of Sciences. It recommended that the survey of private forestry begun by a committee of the society be continued so that a reasonably complete report may be made to the next meeting of the society; and that the society establish a committee on industrial forestry whose purpose would be to study the problems that seem now to be retarding the development of industrial forestry, with their relation to public welfare, and to cooperate with other agencies toward the solution of these problems.

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Forest fire prevention posters lithographed in three colors are displayed in eastern Texas stations of the Southern Pacific, Santa Fe, and Missouri Pacific Railroads. The posters are in two designs, and each bears the name of the railroad using it. They were prepared by the railroads at the suggestion of R. W. Wier, president of the Texas Forestry Association.

Joint Meeting of American and Miss Forestry Associations

Those attending the joint annual meeting o
American Forestry Association and the Missouri
estry Association, held in St. Louis February 1
brought themselves within close range of many a
minds, representing many different interests and
sections of the country. Most of the ideas sh
them had to do with industrial forestry, flood co
and public education in forestry.

A paper contributed by William B. Greeley, ch
the Federal Forest Service, restated his theory
forestry has an important but supplementary pa
flood control. Wilson Compton, speaking for
National Lumber Manufacturers' Association, ass
that the public owes it to timberland owners to a
taxation on forest property and to protect such
erty from fire. Samuel T. Dana, of the Universi
Michigan, emphasized the importance of public fo
and urged the obligation of the lumber indust
support public forestry. Dr. W. W. Long, of Cle
College, South Carolina, discussed "The rôle of fo
in the Greater South" from the point of view o
labor situation. In his eyes forestry has great
bilities as a stabilizer of agriculture in the South, w
at present a very large proportion of the farmer
tenants. Hon. Charles Nagel spoke for the U
States Chamber of Commerce on the subject "For
as a factor in agricultural prosperity;" and Aldo
pold represented the Izaak Walton League in vo
the sportsman's interest in flood control.
speakers were Hon. John M. Parker, former Gov
of Louisiana, and Hon. W. I. Nolan, lieutenant g
nor of Minnesota.

"Stories from real life" about industrial for
projects were told by E. J. White, vice presi
Missouri Pacific Railroad; E. E. Pershall, vice
dent, T. J. Moss Tie Co., Missouri; Devere D
Dierks Lumber Co., Arkansas; H. M. Wilson,
president, Baldwin, Lewis, Pace Co., Florida;
John Rue, Champion Fiber Co., North Car
Mr. White spoke of the tremendous importan
forests to the railroads as a source of revenue.
Pershall told of his company's success in gro
railroad ties at a good profit. Mr. Dierks
optimistically of timber-growing prospects in Arka
saying that taxation is now the only bar to su
Mr. Wilson told of his company's achievemen
keeping down fires. For several years the a
burning on this company's lands has covered con
ably less than 1 per cent of their area. Mr.
outlined the South's opportunity in the manufactu
kraft paper.

In the final session, methods of educating the p
in forest fire prevention and timber growing
discussed by the State foresters of Texas and Alab
the extension forester of North Carolina, repres

es of three industrial concerns, and S. F. Horn, tor of the Southern Lumberman. James M. Wait, the Federal Forest Service, gave the illustrated talk h which he tours rural communities on the national ests of Arkansas.

Resolutions were adopted by the American Forestry sociation appealing to private owners of forest land expand their work of reforestation and sound timber- d management; to the lumber and naval stores lustries, to make further efforts for the elimination of ste through preservative treatment of wood and rough standardization of products; to the United ates Chamber of Commerce, to give earnest consider- ion to the special tax problems involved in the proper e of forest lands; and to the Federal Government, to pand its program for forest planting both on the tional forests and in cooperation with the States.

The Hoo Hoo Club, which has its national head- arters in St. Louis, took an enthusiastic and hospi- ble part in the meeting. The president of the local apter, M. E. Meacham, acted as chairman of the ssion on forests and industry.

Tree Growth in a Massachusetts Plantation

White pine, Scotch pine, and European larch trees in 2-acre plantation in the town of Lee, Berkshire ounty, Mass., are reported by the State department f conservation to have reached an average height of 0 feet in 40 years' growth. The trees were planted by 8 feet apart. Their present number, diameter, nd volume are as follows:

	Number of trees	Average diameter at breast height	Volume in board feet
		Inches	
White pine	271	10	25, 000
Scotch pine	47	11	5, 500
Larch	321	9	25, 000
Total	639	----------	55, 500

Arkansas Farmer Plants Black Locust

On waste hillside land on his farm at Pyatt, Marion County, Ark., Ernest Young last year planted 2,000 black locust trees, 6 feet apart each way. The space between the trees was planted to clover. After two years, when the trees will have grown well above the clover, the land can be pastured. Since both the black locust and the clover are nitrogen-fixing plants, while raising the double crop of fence posts and forage the land will be greatly enriched. Mr. Young intends to plant from two to four acres to black locust each year until every acre of his waste land has been reforested.

Handy Timber Scale Sticks

A new set of timber scale sticks for measuring logs and for estimating the contents of standing trees has recently been made available to the public by the American Forestry Association. The Federal Forest Service furnished the directions for use and the descriptive text which accompany the set of sticks.

These timber sticks are intended for the use of farmers, particularly in the Middle Atlantic and Southern States. They show the contents of logs and of standing trees of shortleaf and loblolly pines, as scaled both by the commonly used Doyle rule and the more accurate International log rule. With their use it is a simple matter, also, to estimate the contents of standing trees of any species. The tree scale stick shows the diameter of the tree, and also its height in feet or the number of 16-foot log lengths. By making an estimate of the top diameters of the successive logs in a tree and by using the log scale, one can quickly scale up the contents of the tree in board feet. This is the only safe method of estimating hardwoods, such as the oaks, poplars, gums, and maples.

The values shown on the tree scale stick for shortleaf and loblolly pines practically hold good also for the longleaf and the slash pines, respectively, since in taper, or form, there is a close resemblance between the shortleaf and longleaf and between the loblolly and slash pines. All these values are shown by the Doyle log rule and by the International rule.

Publicity given to these timber sticks by the Associated Press has stimulated requests for a similar set of sticks distributed by the Federal Land Bank of Springfield, Mass. The latter show by the International rule the scale of logs and the scale of standing trees of several kinds of northern conifers and of hardwoods, as well as the scale of trees in fractions of a cord.

The Doyle and International timber scale sticks for the southern region, with a pamphlet of instructions, are inclosed in a substantial cloth case and are being distributed postpaid at cost, $1, by the American Forestry Association, Lenox Building, Washington, D. C.

Loblolly Plantation in New Jersey Makes Good Growth

A plantation of loblolly pine established 20 years ago on the sandy soil of the Bass River Forest in southern New Jersey will now cut more than 5,000 board feet of box boards per acre, Extension Forester Scovell reports, even though the trees are not now closely spaced. Some of the trees are 40 feet high and 11 inches through the stem at breast height. These individuals have made an average growth of 2 feet in height and more than half an inch in diameter for each of the 20 years. Native hardwood stands of the region, growing on the same type of soil, seldom make half that growth.

Legislation Pending in the Seventieth Congress

Forestry is receiving a good deal of favorable attention in the present Congress. Hearings on the McNary-Woodruff bill and on the McSweeney-McNary bill took a turn decidedly gratifying to advocates of the expansion of Federal purchase and research programs.

The Woodruff-McNary bill, which would establish a fiscal policy for the purchase of forest land for a 10-year period and would authorize total appropriations of $40,000,000, was passed by the Senate on February 6 with an amendment through which the total appropriations could be made in 8 years instead of 10 and a further amendment that except for purposes of flood control and protection of navigation the acreage to be acquired in any single State should not exceed 1,000,000.

At the conclusion of Senate and House hearings on the McSweeney-McNary bill to establish a definite Federal policy in forest research, the group present visited the White House to tell the President of the purpose of the bill and its urgency, and appeared before the Director of the Budget, who held a short hearing. With the approval of the Department of Agriculture, the bill has been given Budget approval.

Additional bills having to do with forest research that are pending in one or both houses would authorize investigation of waste in the manufacture of pulp and paper, research in hardwoods, the establishment of experiment stations in the northern Rocky Mountains, Georgia, and Arizona, and the establishment of nurseries in Nebraska and California.

The bill extending the Utah National Park and redesignating it as the Bryce Canyon National Park has passed both Houses.

On February 20, the House passed bills making additions to the Idaho, Challis, and Sawtooth National Forests, all in Idaho. Other pending bills which have not yet passed either House contemplate additions to 11 national forests. Four of these would also extend the general exchange act to outside lands in private ownership.

A bill introduced February 4 would authorize the President, upon joint recommendation of the Secretaries of Agriculture and the Interior, to withdraw from entry under the public land laws areas of national forest land chiefly valuable for recreational uses.

Other pending bills would authorize the purchase of lands within the Absaroka and Gallatin Forests for winter range for the Yellowstone elk herd, and the acquisition of lands within the Lassen Volcanic National Park. A bill to grant to the State of California certain national forest lands lying between the two units of the Calaveras Big Tree Grove, in the event that the grove becomes State property, passed the House on February 20.

Bills to authorize the withdrawal from entry of lands comprising the watershed of the Taos In Pueblo within the Carson National Forest have introduced in both Houses, and the House bill passed on February 20.

Bills have been introduced in both House authorize the withdrawal from entry of lands w form parts of municipal watersheds, to authorize ulations governing the use of such lands, and to vide for cooperative watershed-protection agreem with municipalities for periods not exceeding 25 y

Two bills relating to the control of grazing w national forests are pending in the Senate. T bills relating to the control of grazing upon the reserved public domain also are pending, one in Senate and two in the House.

Other bills now pending in one or both Houses w amend the protective and cooperative features o Clarke-McNary Act; cede the unreserved public main to the several States; allow the State of W ington to select certain national forest land to deficiencies in the land-exchange program; increas percentage of national forest receipts paid to States; grant additional powers of arrest to forest cers, and penalize assault on forest officers in the charge of their duties; and authorize the Preside establish game sanctuaries within national forest proclamation.

Forest Protection Board Expande

The Federal Forest Protection Board, organiz year ago by the chief coordinator, has enlarge membership. In addition to representatives of four bureaus administering forest land and of Weather Bureau, it now includes representativ the bureaus dealing with forest problems relati insects, rodents, and tree diseases—the Bureaus o tomology, the Biological Survey, and Plant Indu

At a January meeting the board decided that committees should be organized to act for it so f possible in handling local problems of interbu cooperation in forest protection. Accordingly, committees have been appointed from the field or zations of the eight bureaus, one committee in ea six divisions of the West. These committees ar pected to consider local opportunities for the bu to act together in purchasing materials and su for forest protection and in training men for fores protection work; studying forest problems relati insects, rodents, and tree diseases and carrying operations for the control of forest pests and diseases; analyzing fire records and providing other with consultants in fire analysis; and m studies looking toward better correlation of am appropriated to different bureaus for forest-prote work.

dlings from Historic Gethsemane Cypress Trees

Vhile visiting in the Holy Land in the summer of 4 Ansel Hall, of the National Park Service, noticed t some of the cypress trees in the Garden of Geth- ane had a good crop of cones. Finding the seed to of good quality he collected a pocketful of cones and fully brought them back with him to California. seed were sown by Woodbridge Metcalf at the est nursery of the University of California in Berke- With careful attention about 300 germinated grew into sturdy seedlings, which at the end of the wing season averaged 2 to 3 inches in height. Half seedlings were placed in a transplant row on the keley campus and the others were sent to the State est nursery at Davis, where they were planted in s. By the winter of 1926–27 the trees at Davis re 8 to 12 inches high. The trees are now growing in urchyards and public grounds in many parts of Cali- nia and elsewhere and reports are being received of their satisfactory growth in many situations. One planted on the grounds of the Congregational Church of Paso Robles at Christmas, 1926, made a growth of more than 20 inches in height during the following year and is now 40 inches tall.

A few of these rare trees are still available for planting in places where their significance will be appreciated. Particulars can be obtained from the State forester, Sacramento, Calif.

* * *

On lands in the State of Washington west of the Cascades and not included in national forests, 88.7 per cent of all the timber killed during the fire season of 1927 was killed in the period when the relative humidity went below 30 per cent, the Washington Forest Fire Association reports. This same period saw the destruction of 74 per cent of the logs destroyed during the season. The danger period was from July 16 until August 25, with a break on August 19.

Foreign Notes

oots of Alders Protect Stream Banks

Roots of alders on stream banks make a good pro- ctive curtain against the erosive power of freshets, cording to observations made on a stream in Switzer- nd by W. Nageli and reported in the Journal Forestier iisse for December. This stream, which flows into ake Geneva and is called Baie de Montreux, over- owed its banks as a result of a sudden downpour on ugust 2, 1927, and caused great damage along its wer course. After the flood, examination revealed hat in places where the channel of the Baie de Mont- eux was wide and where alders were growing the banks ere vertical and were clothed in a closely matted net- ork of alder roots which protected them against fur- her erosion. These roots were as much as 3 meters ng and, pressed against the bank by the flow of the ater, acted as a protecting curtain. In places where he banks were not wooded or where conifers were rowing the erosion was much greater. In those parts f the stream where the abrasive action of solid matter n the water was fully effective, as in narrow places or t curves, the protection given by the roots of the lders was much less evident. Even there, however, lthough the flood had scoured all the bark off the runks of some of the trees, no trees had been uprooted.

A Biological Soil Problem

By E. N. Munns, United States Forest Service

The failure of alfalfa in many localities years ago was found to be due to a lack of nitrogen-forming bacteria in the soil. When these bacteria were supplied, alfalfa flourished where before it had failed. Somewhat similar failure in trees has been noted by a number of foresters who attributed the poor growth of trees in certain seed beds—or even in patches within a seed bed—to all manner of troubles such as damping-off, sun scald, poor soil, or drought. It has remained for S. L. Kessell, conservator of forests in western Australia, to put forth a reason for such patchiness that seems just as plausible as that for the poor catches of alfalfa.

In the Australian planting work, which has been extended rapidly in the past six years so that now 14 large nurseries are in operation, trouble early developed with Monterey pine (*Pinus insignis*) and Stone pine (*Pinus pinaster*), the two pines used most extensively. After successful germination the Monterey pine would turn a sickly yellowish green and its needles would become dwarfed. The Stone pine turned reddish and its needles, likewise, assumed a stunted form. Investigation disclosed that neither shade, water, soil acidity, soil chemicals, nor disease was responsible. Elimination of the variables one by one forced the conclusion that some soil organism necessary to the normal development of trees of these species was not generally present in the local soils. Soil from nurseries where the young trees grew thriftily was transported to the new nurseries and sprinkled generously over the surface. Marked results appeared almost instantaneously. Trees developed a healthy color and took a new lease on life, and the new needles were of the proper length for the species. When the soil was applied to seed beds in advance of sowing, the seedlings developed normally and thriftily from the start. Whether or not this result is due to a mycorrhiza is unknown as yet, but the fungus was not found in the original soil and is found in the new. Some biological factor, whether fungus or bacteria, would seem to be involved.

Not only do the two pines mentioned respond to the treatment, but so do some other American species—the slash, shortleaf, longleaf, and Bishop. Perhaps some of our own nursery soils would respond to similar treatment.

Dying Oaks in Europe

By R. E. Balch, United States Bureau of Entomology

Since writing in the Forest Worker of November, 1927, about the dying oaks in this country I have read of an apparently similar condition in Europe which suggests that this mortality is widespread and perhaps of periodic occurrence.

In the Quarterly Journal of Forestry, January, 1927, R. L. Robinson draws a comparison between the death of large numbers of oaks in Slavonia, Jugoslavia, and a similar trouble in the south of England. In both cases defoliation by caterpillars (*Tortrix viridana* in England and *Liparis dispar* in Slavonia), followed by an oak mildew on the leaves (*Microsphaera alni*, var. *quercina*), preceded the death of the trees. The trees were nearly all making fair growth at the time of death. Armillaria mellea was present on the roots of all those examined. The trees died suddenly during the summer, singly or in groups, much as they have been doing at intervals for a number of years in the Lake States, Middle Atlantic States, and Southern Appalachian region. Pedunculate oak was by far the most susceptible species.

L. H. Osmaston in the same number of the journal comments on the condition in England and notes that oaks of all ages from 20 to 150 years have been involved. He mentions as contributary causes defoliation, mildew, Armillaria, drought, and "possibly, bad silvicultural conditions."

Doctor Yossifovitch in the Revue des Eaux et Forêts, June, 1927, says that in Slavonia 125,000 acres of oak forests have been decimated in 15 years. He mentions the same factors as "predisposing causes" and thinks that probably Armillaria delivers the death blow. In
the January number of the same journal, J. Demo
draws attention to recent great losses of oak in the
stands of the Forêt de Compiegne as well as in
parts of France.

Although the species of oak and, with the exce
of Armillaria, the fungi and insects involved are
ent, the deaths in Europe seem to occur in essen
the same manner as those in America. In the
pean as in the American instances there is a com
tion of adverse circumstances, none of which, how
appears to explain very satisfactorily the su
mortality. It may be that certain oaks, when
development is checked by some such conditio
drought or defoliation, rapidly succumb to any o
more of these enemies; or possibly some factor a
unrecognized is at work.

Protection Forests Established on vately Owned Lands in France

In accordance with the provisions of a law en
April 28, 1923, and known as the Chauveau Law, 2
hectares of forest on privately owned land in F
has been classified as "protection forest" and put
regulation to protect it from avalanches, erosion
the encroachments of water and sand. In add
24,505 hectares have been listed for classification,
ing a total of 53,387 hectares. About two-thir
the total (34,156 hectares) is in the region o
Pyrenees.

The law requires the forestry authorities,
making sure that the wooded condition of the la
preserved, to exercise care not to impose on propr
any measure that will diminish the revenue fro
forests and has a provision for indemnities in ca
loss to the proprietors. The business has been ha
in such a way that so far no proprietor has
application for such indemnity.

Japanese Law Protects Natural M ments

Japan has a law, passed in 1919, that authoriz
department of home affairs to designate "n
monuments" for preservation. The law appli
privately owned monuments as well as to those
licly owned, but provides for indemnity to any
prietor who is injured by the restraint on the u
his property.

Under this law types of monuments in the veg
kingdom listed as suitable for designation b
minister of home affairs include trees remarkab
their size or age, typical virgin forests, types of
vegetation, rare plants, interesting landscapes
taining remarkable plants, plants that are bec
rare, waterfalls harboring characteristic plants,
bogs and their most typical plants, and dunes
have been stabilized by vegetation.

the first seven counties covered by a Government ey of the forest resources of Norway it has been d that the average volume of timber per hectare 7 acres) is 45 cubic meters (35.32 cubic feet), with nnual increment of 1.37 cubic meters.

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ncrement cores taken in the general forest survey in progress in Sweden are preserved by inserting core in a paper tube one end of which is closed flattening and stapling. The tubes are made of ral turns, or layers, of paper and so are stiff enough ndure ordinary handling without becoming bent. rinted form on each tube permits the entry of a rd identifying the core.

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he tree-planting division of the Canadian Forest vice in 1927 shipped to the prairie Provinces 0,000 broadleaf seedlings and cuttings. More than 00 farmers shared in the distribution.

Forest fires in British Columbia burned over a smaller area in 1927 than in any other year since 1913 and caused only one-tenth as much damage as those of 1926, Minister of Lands Pattullo reports. Of the 1,284 fires reported during 1927, 88 per cent were kept within a limit of 10 acres. The total acreage was 102,000. Fire-fighting costs amounted to a little more than $80,000, the lowest figure for any year since 1923. Campers and travelers caused 27 per cent of the reported fires.

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A superficial root of a gum tree in the forest of Bled Talha, Sahara, measured by Forest Inspector L. Lavauden, was more than 42 meters long. Inspector Lavauden states that the downward development of tree roots in the Sahara is not less than this, and adds: "I have measured roots going straight down into the soil that were as thick as my fist 8 meters below the surface."

Personals

William B. Greeley, chief of the United States rest Service, will resign May 1 to become secretary-nager of the West Coast Lumber Manufacturers sociation. Mr. Greeley's connection with the Forest rvice has been continuous since 1904, with the exption of two years' military service. Twenty years he was called to Washington from the field to come assistant chief of the division of forest managent. Later, after serving for a time as district forer of the northern national forest district, he came chief of forest management. During the orld War he was given charge of recruiting forestry ops for overseas duty, and then was placed in comnd of the forestry regiment, the Tenth Engineers, France. In 1920 he succeeded Henry S. Graves as ief of the Forest Service.

Mr. Greeley is to be succeeded by R. Y. Stuart, his sistant in charge of public relations work. Mr. uart likewise entered the Forest Service directly om the Yale Forest School, in 1906. After six years' perience on the western national forests he joined the ashington staff as inspector of national forest timber les, and later he took charge of the entire western vision of this work. In 1917 he was furloughed for ilitary service overseas with the Tenth Engineers. 1920 he became deputy commissioner of forestry in ennsylvania, and throughout the administration of Gifford Pinchot as Governor of Pennsylvania he had full charge of the State's forestry work, as secretary of the department of forests and waters. He assumed his position as chief of the Forest Service branch of public relations in February, 1927.

W. E. Jackson, jr., has been appointed State forester of Kentucky, succeeding Fred B. Merrill whom he formerly assisted.

Harry Lee Baker, assistant forest inspector of the division of State cooperation, United States Forest Service, has been appointed State forester of Florida. For the past two and one-half years Mr. Baker has had charge of investigations, authorized by section 1 of the Clarke-McNary Act, looking toward permanent and adequate fire protection for the different forest regions. In 1926 he made an extended study of forest-fire conditions in Florida. Mr. Baker has had 10 years' forestry experience on the national forests of the West, and has served as district forester in Virginia and assistant State forester in North Carolina. He will assume his duties in Florida soon after April 1, with headquarters at Tallahassee.

H. O. Cook has resigned as extension forester for Massachusetts. R. B. Parmenter, who was Mr. Cook's assistant, has succeeded him.

Lars G. Romell, of the Swedish Forest Experiment Station, Stockholm, has been appointed to the Charles Lathrop Pack research professorship in forest soils at Cornell University, and will take up the duties of that chair about April 1, 1928.

A. B. Brooks, for six years chief game protector with the West Virginia Game and Fish Commission, has resigned. Ernest Angelo, a member of the faculty of the Department of Agriculture, University of West Virginia, has been appointed to succeed him.

R. H. Colley, pathologist in charge of the work in forest pathology carried on by the Bureau of Plant Industry at the Forest Products Laboratory, Madison, Wis., has resigned to accept a position with the Bell Laboratories, New York City. Doctor Colley entered the bureau's office of forest pathology in 1916, and began his work at Madison in 1921. In his new position he will direct research and survey work on the engineering and pathological problems encountered by the Bell Telephone Co. and its associates in connection with their use of poles and other wood products.

R. R. Fenska, who since the beginning of his sabbatical leave from the New York State College of Forestry, September 1, 1927, has been forester for the Massachusetts Forestry Association, resigned that position February 15 to accept one as field representative for the West Coast Lumber Trade Extension Bureau, Longview, Wash. On September 1, 1928, he will again take up his duties as professor of forest engineering at Syracuse University.

E. B. Stone, forest examiner on the White Mountain National Forest, has been appointed assistant State forester of Georgia.

Dr. David Fairchild has requested that he be relieved of charge of the office of foreign plant introduction, Bureau of Plant Industry, and has been succeeded by Knowles A. Ryerson. Doctor Fairchild has had charge of this office almost continuously since its inception in 1897. He will remain with it as senior agricultural explorer and in an advisory and consulting capacity and will conduct special studies of foreign-plant introduction with particular reference to plant breeding and improvement of crop plants. Mr. Ryerson recently acted with a commission making an agricultural survey of Palestine, and since then has served as horticulturist for the Government of Haiti.

Shirley W. Allen, forester for the American Forestry Association, has been appointed to the staff of the School of Forestry and Conservation, University of Michigan, effective April 1. Mr. Allen's activities for the present will consist in efforts to introduce and strengthen forestry and conservation teaching in the public schools of Michigan.

A. H. Howell, of the Bureau of Biological S
has been assigned to investigations of animal e
at the Appalachian Forest Experiment Station.
work this spring will be upon a determination
relative abundance of rodents on the Bent
Experimental Forest.

Hugh P. Baker has left his position as secr
manager of the American Pulp and Paper Assoc
to take charge of the newly created departm
industrial relations of the United States Cham
Commerce.

Carlos G. Bates has found it necessary to gi
work in the biological section of the Forest Pr
Laboratory, Madison, Wis., because of poor h
Mr. Bates has been assigned to the Lake States
Experiment Station, St. Paul, Minn., and A
Koehler has taken his place at the laboratory.

Dr. J. von Monroy, who visited America in 1
now in charge of the committee of foreign relatio
the committee for forest machinery of the De
Forstverein, with offices at Hedemonstrasse 30,
SW. In this capacity he will be glad to see all Am
foresters visiting Germany, to help them get in
with German foresters in their own lines of work
to assist them in arranging their tours.

G. E. Marshall has resigned as supervisor
Minnesota National Forest, on which he has
continuously since it was established. In 19
directed a crew of land examiners and cruisers
General Land Office in appraising land of the Chi
Indians that is now included in the national
Mr. Marshall will hereafter be associated wit
Weyerhaeuser Timber Co. in Minnesota.

James D. Kennedy has been released by the
York State Conservation Commission from his
as blister rust control agent for the five-month
beginning January 16, and during that time will
Prof. J. A. Cope as extension forester for New
This arrangement will enable Professor Cope t
part time to resident teaching work.

Officers elected by the Society of American For
for the year 1928 are O. M. Butler, president;
Chapman, vice president; Ward Shepard, secr
and S. B. Detwiler, treasurer. R. Y. Stuart has
elected a member of the executive council.

A. R. Trist, a research forester of Australia, has
sent by the Australian Government to the U
States to study the methods employed in silvic
search in America and the organization of the
experiment stations. Mr. Trist has visited the N
eastern Forest Experiment Station and is now en
in the Yale Forest School. He will be in this co
for two years.

Bibliography

Timber Growing in South Africa

By E. N. **Munns**, United States Forest Service

The one who picked up "Tree Planting in South rica," by Dr. T. R. Sim, of Natal, expecting to find a l discussion of planting problems and technique, the ok proved a disappointment; for reforestation is entioned only in passing. The main part of the book devoted to a description of various species that have en found useful in South Africa or that hold possiities of usefulness in that country, together with the inions of authorities (which often differ markedly) as the value, growth rates, or uses of individual species. ut against a background of experience with the same ecies in southern California, where climatic conditions e similar to those the author considers, the book is teresting. For any one interested in general forestry ork in South Africa, the volume is full of meat and as value as a reference. A glimpse at the table of ontents tells the story, for there are chapters on the mber famine, timber problems, wood utilization, imate and erosion, pests and troubles of trees, growth, are of the forest, harvesting, trees for lawns, farms, nd forests, indigenous trees, and exotics grouped under ines, acacias, eucalypts, cedars, and miscellaneous. nd among this array one finds two short chapters on lanting!

Since the author has seen 20 years' development of imber growing in South Africa, his observations on he economics of forestry are interesting and unique. He tells the South African farmers that in growing imber they are dealing "with a rotation crop, not with a sentimental heirloom to posterity."

Most of the forest land of South Africa is veld or brushland, though in restricted localities there are some valuable tropical hardwoods. These do not meet the demands for boxwood, construction timbers, etc., and the annual bill for timber imported from the Baltic countries is about $15,000,000. The Government embarked in 1922 on a policy of planting each year some 10,000 acres, and so far has lived up to it fairly well. Some plantations have failed, others have succeeded.

The Monterey pine has demonstrated its worth as a general utility tree for South Africa, and is being grown upon a 30-year rotation. This tree is generally recommended for most planting operations, and the wood is praised for all kinds of uses. Canary island pine is to be preferred for poorer sites, but its wood is classed as far inferior. Slash pine grows well in wet and swampy places, but is not yet old enough to give an indication of yields. The cluster pine, also, is recommended as being better than the Monterey for some sites. Among the eucalypts E. saligna is given first place, followed by the better known and widely used trio that appear to do so well everywhere, E. tereticornis, E. rostrata, and E. globulus. Of the acacias, A. melanoxylon, A. decurrens, and A. mollissima do best in South Africa, as in California.

Growth in South Africa is astounding. Monterey pine is reported to have grown as much as 8 feet a year, and one patch of eucalypts sustained for 11 years an annual growth of 12 feet in height and 1 inch in diameter. However, poor form and slow growth are as characteristic of these species on poor sites in South Africa as under similar conditions in California. Slash pine apparently does not do so well in Africa as in its native haunts.

The book is illustrated with drawings by the author.

The bibliography contains 169 references. One notes that most of the American titles are of rather ancient vintage. Apparently South Africa and the United States have had little interchange of forestry literature since about 1911. Should not more effort be made to keep foreign foresters posted as to what we are doing? Doctor Sim's quotation of American publications 20 years old in support of his arguments for or against a species also suggests the question, do not we also greatly err in quoting old foreign publications? The answer is no; most of us don't read foreign publications anyway.

Management Plans

An exposition of Forest Service methods of making forest plans has just been published under the title "Management Plans," by Inman F. Eldredge, formerly forest inspector in the Forest Service. The publication was written with special reference to the national forests, but contains much information useful to foresters and timber owners generally, especially those who are engaged in making or carrying out management plans. In an appendix are given the management plans which have been put into effect for the Custer Working Circle, Harney National Forest, South Dakota; Meadow Valley Working Circle, Plumas National Forest, California; Woodland Working Circle, Pike National Forest, Colorado; and Rio Pueblo Working Circle, Carson National Forest, New Mexico.

Copies of this bulletin (Miscellaneous Publication No. 11-M) can be obtained without charge by writing to the United States Forest Service, Washington, D. C.

Range Revegetation in Colorado

By William A. Dayton, United States Forest Service

In "Revegetation of Waste Range Land" Dr. Herbert C. Hanson, of the Colorado Agricultural College, Fort Collins, Colo., reports that favorable results have been obtained in Colorado by artificial sowing of the seed of forage plants. Abandoned plowed areas in the foothills were sown to smooth brome and slender and crested wheatgrasses, and certain alkali seepage lands to slender wheatgrass, yellow sweet clover, meadow fescue, redtop, and smooth brome. These sowings were preceded by proper soil preparation. He further states that with a suitable wind common sagebrush (especially if tall and dense) may be quickly destroyed by fall burning, and that a good stand of native grasses follows such treatment. Naturally, this practice should be taboo where there is a forest-fire hazard. Doctor Hanson has found that range areas undergoing revegetation should be protected from grazing for at least one year and that when they are grazed the deferred and rotation systems of grazing should be applied to obtain maximum carrying capacity and forage production.

Doctor Hanson's bulletin, Colorado Agricultural Experiment Station Bulletin 332, is illustrated with seven views of Colorado range improved by artificial seeding or other methods.

An English Paper on Bark Beetles

By F. C. Craighead, United States Bureau of Entomology

A valuable addition to the literature on bark beetles has been made by Dr. J. M. Munro in his "British Bark-Beetles" (Bulletin No. 8 of the British Forestry Commission). This is a paper of 77 pages illustrated with 32 text figures and 10 excellent plates. The first and second of the four chapters give an excellent general picture of the biology of the bark beetles of the British Isles and the relation of these beetles to the practice of forestry. Most forest entomologists of this country will find themselves in agreement with Munro's opinions on the ineffectiveness of natural enemies, the relation of bark beetles to forestry practices and particularly to slash disposal, and the preference of the beetles for unhealthy or less vigorous trees. Here, however, a note of caution may be sounded; the conclusions he draws as to the secondary nature of the British species and the influence of weather conditions should not be too strictly interpreted as applying to American conditions. In this country, owing to the great damage caused by Dendroctonus, the problems upon which the British entomologists are working receive little attention.

Forest pathologists should be interested in D
Munro's discussion of the interrelation of bark be
and fungi, a rich field for further investigations.

Chapters 3 and 4 deal with the structure, class
tion, description, and habits of the British sp
giving much fine biological detail. Appendix 1
the bark beetles occurring in various host trees
plants. Scotch pine (*P. sylvestris*) is host to by fa
largest number of species. Appendix 2 gives a
good bibliography, which is appropriately discuss
the text. Although several references are made i
text to American conditions, the bibliograph
markedly lacking in titles of recent American litera

This is undoubtedly the best general work upo
Scolytidae that has appeared since Swaine's bul
on Canadian bark beetles. Although its standpoi
that of conditions in the British Isles, the pictu
draws is broadly applicable to this country. Cha
1 and 2 should be read by all American foresters
forest entomologists.

A Study of Federal Aid

In a volume entitled "Federal Aid" just iss
Dr. Austin F. Macdonald of the University of P
sylvania gives a concise account of the Weeks
Clarke-McNary cooperative work. To foresters,
ever, the chief interest of the book will be not so m
the forestry chapter as the way in which Doctor
donald brings out the relation of the forestry coo
tion to the whole of what he calls "the American
sidy system." Chapters are included on agricul
extension, highways, vocational education and
bilitation, hygiene of maternity and infancy, and
national guard. Also the history, evolution, and f
of the system of Federal aid are discussed. The
ume is written in a clear and easy style and wit
waste of words.

Recent Publications of the Forest Ser

Circulars: 19, Forests and Floods; 21, America
the World's Wood Pile.

Map Folders: Natural Bridge, Mount Hood, Wash
National Forests of Arizona and New Mexico.

Forest Products Research in Pictures: 79, Lu
Moisture Change in Box Car not Important.

American Forest Week Material: Program for Obs
ance of American Forest Week (revised); Fore
Facts (16 pp.); President's Proclamation of A
can Forest Week, April 22–28, 1928 (1 p.); How
Can Help Protect the Forests (card about 5½
10 inches, with pictures and text).

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Announcements

Pan Pacific Science Congress

The Fourth Pan Pacific Science Congress will be held in Batavia, Buitenzorg, and Bandoeng, Java, during May and June, 1929, under the auspices of the Pan Pacific Science Association, in which the United States is represented by the National Research Council. Dr. A. A. L. Rutgers, chairman of the Netherlands Indies Pacific Research Committee, is general president of the congress.

Forest Entomology at International Congress of Entomology at Cornell

The general plan outlined for the forest entomology sessions of the Fourth International Congress of Entomology, to be held at Cornell University, Ithaca, N. Y., August 12–18, is as follows:

Tuesday, August 14, 2.30: Bark beetles and other insects attacking conifers.

Wednesday, August 15, 2.30: Silvicultural and other practices in relation to forest insects.

Thursday, August 16: Miscellaneous forest and shade-tree insects.

Those desiring to present papers should get in touch with the secretary of the section on forest insects, Dr. G. H. Herrick, of Cornell University.

Annual Meeting of North Caroli Forestry Association

The North Carolina Forestry Association wil its eighteenth annual meeting in the Goldsboro, community house, September 19–21. In conn with the meeting it is planned to hold a fo exhibit and to give a demonstration of farm fo

National Conference on State Pa

The Eighth National Conference on State will be held in California, beginning June 26, Meetings will be held at the Mark Hopkins H San Francisco June 26–29, and at the Cham Commerce, Los Angeles, July 2.

Meeting of Ecological Society America

The Ecological Society of America will hold a ing at Pomona College, Claremont, Calif., in co tion with the meeting of the Pacific Division American Association for the Advancement of S June 13–16, 1928. An independent session Ecological Society and one in which it will joi the Western Society of Naturalists will be helc ably on Thursday, June 14.

Because the free edition of this periodical is necessarily limited, it can be distributed without cha outside of the Government service only to such persons and organizations as State forestry and conser tion officials, State agricultural extension directors, faculties and libraries of forest schools, and fores associations. Others desiring to obtain copies of the FOREST WORKER can do so by sending 5 cents fo single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Pri ing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

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ashington, D. C. MAY, 1928 Vol. 4, No. 3

State Forestry

ennsylvania Buys New State Forest Lands

After a period of years in which no land was pur- ased in Pennsylvania for State forests, because the islature made no appropriation for that purpose m 1919 to 1926, the Pennsylvania State Forest mmission has just completed negotiations for the rchase of 112,740 acres. At the same time it author- d additional purchases of 60,000 acres. The acqui- ion of these 172,740 acres, the largest area purchased the commission in any year since 1902, will practi- ly exhaust the $500,000 appropriation provided by e Pennsylvania Legislature in its session of 1926-27. will bring the total area of Pennsylvania State ests to 1,305,790 acres.

The land included in the 112,740-acre purchase just de lies in Potter, Cameron, Tioga, Union, Lycoming, earfield, Elk, Jefferson, Perry, Cumberland, Frank- , and Centre Counties.

South Carolina Appropriates for Forestry

The South Carolina Legislature has made an appro- iation of $4,000 for State forestry activities during e calendar year 1928 under the provisions of the restry law enacted a year ago. The State forestry mmission has lost no time in dedicating a portion this appropriation to work for the protection of the ate's forests from fire, entering into an agreement th the Federal Government for cooperation under ction 2 of the Clarke-McNary law.

orest Reserve Purchases in New York

Fourteen contracts for the purchase of land for forest reserve purposes, totaling 3,299.35 acres, were pproved in March by the Board of Commissioners the New York Land Office. The 1,807.85 acres vered by nine of the contracts are located in the Cats- ll forest preserve, the remaining 1,491.5 acres being the Adirondacks.

Thirty-eight States Now Cooperating in Clarke-McNary Fire Protection

Now that Indiana and South Carolina have entered into cooperation with the Federal Government in protecting their forest lands from fire, 38 States in all are thus cooperating under the provisions of the Clarke-McNary law. Of the 39 States whose timberlands make them eligible to do so, the only one that has not yet joined in this cooperative work for forest protection is Arkansas. In Arkansas, although the State itself is not active in forest protection, it is reported that private owners of forest land are spending $75,000 a year in protecting lands aggregating about 4,000,000 acres. This private work, and the work of the Forest Service on the two national forests in Arkansas, give fire protection to about one-half the pine lands in the State.

North Carolina to Study Effects of Fire on Pine Timber

In cooperation with the Cooper River Timber Co., Wilmington, N. C., the North Carolina Department of Conservation and Development is establishing plots on which to make a 10-year study of the effects of fire on timber. The first plot has been established on longleaf pine land owned by the timber company in Pender County. Three adjacent tracts, each containing one-twentieth of an acre, have been laid out, divided by hand-raked fire lines, and surrounded with a hog-tight fence and a plowed fire line 6 feet wide. The seedlings have been counted, measurements and growth studies carefully recorded for all trees, soil samples sent away for analysis, records made of the character of vegetation, and photographs taken of each plot from an established point. One tract was burned over in February, another will be burned in May or June. Throughout the period of the experiment these burnings will be repeated each year, the third tract being kept free from fire. Counts of trees, growth studies, studies of vegetation, and photographs will be made annually.

Five such plots are to be established in the different districts of the State within the present year.

White Pine Blister Rust Control Work in New Hampshire

To protect New Hampshire forests from white pine blister rust the towns and cities of the State last year spent nearly $29,000 and individuals spent more than $3,700. Aid given by the State to towns, cities, and individuals made the total outlay in 1927 almost $41,000. In many of the 77 towns and cities that made appropriations for this purpose in 1927 the work consisted in a reexamination of pine lands on which work for the eradication of Ribes had been carried out years ago. The work done in 1927 cost about 18 cents an acre.

Delaware Forestry Department Encourages Planting

During the first year of its existence the Delaware Forestry Department has distributed 46,000 seedlings for reforestation purposes. Every order for planting stock filled by the department is to be followed up to see whether the trees are planted in accordance with directions. In any case in which this is not done, the Delaware law permits the refusal of further shipments.

Near Milford, Del., a State forest tree nursery has been started on 4 acres of light, sandy loam—the typical soil of southern Delaware. It is planned to seed 1½ acres this year, and an equal area next year; the remainder will be used for producing three-year stock and transplants.

Forest fire loss in Delaware was materially reduced during the year, the forestry department reports, through the activity of some 34 volunteer fire companies situated throughout the State. These cooperating companies were equipped with forest fire fighting tools from the State forestry appropriation.

Timbered Counties in Mississippi

Ten counties of Mississippi have more than 100,000 acres each of timbered lands, according to the report of the State tax commission for the tax year 1926. These include five contiguous counties in the Yazoo Delta—Yazoo, Humphreys, Leflore, Grenada, and Calhoun. The other five extensively timbered counties are scattered through the State—Tippah, Noxubee, Leake, Pearl River, and Wilkinson. Thirteen counties have on their assessment rolls from 50,000 to 100,000 acres each of timbered lands, and exactly half the counties in the State have at least 25,000 acres apiece. For 10 counties the commission made no report on timbered lands. Timbered areas throughout the State total 3,300,102 acres, of which more than one-half is included in 19 counties of the northern half.

Special Lines of Planting Stock Suppl
by the New York Conservation I
partment

As a vendor of forest planting stock the New
Conservation Department this year announced a n
ber of "special lines." Because of the great den
in recent years for larger-sized trees, it has mucl
creased its supply of transplants. To meet the ste
increasing demand for balsams, which many peopl
beginning to plant for Christmas trees, the
nurserymen have prepared a good supply of
trees in 3-year-old stock. An innovation is the
ing of the straight-formed "Riga" variety of Sc
pine. European larch is being specially recomme
by the department for farm use, as a fast-growing
that makes good fence posts, and has been made a
able in large quantity in the 2-year-old size.
Saratoga nursery has been well supplied with
locust, a tree in large demand in recent years espe
among farmers in the western part of the State.
cause of the popularity of white pine and No
spruce a larger supply of these trees has been pro
than ever before.

In addition to growing trees the department
year is in a position to supply Carolina poplar cutt
not rooted. These are about the size of a lead
and are supposed to be planted in a wet garde
cultivated for a year, at the end of which time the
ought to be from 2 to 4 feet high and may be se
in plantations.

Additions to New Jersey State Fore

The Belle Plain State Forest has been creat
Cape May County, N. J., between Belle Plai
Woodbine. The area already purchased amou
729 acres, and the State has options on several
cent tracts. An addition of 676 acres has been
to the Stokes Forest, and other additions bring
Jersey's total State forest acquisitions of the pa
months to 1,658 acres.

Revenue derived from the State forests of
Jersey during the past fiscal year was equal to 1
cent of their maintenance and development costs,
Forester Wilbur reports. Most of the income wa
the sale of timber cut in thinnings.

* * *

The Clarke County State Forest of Indiana ha
enlarged to about 5,000 acres by a recent purch
142 acres. Most of the addition is in second-g
oak, hickory, and pine; about 22 acres consi
abandoned fields which will be planted to pi
spruce.

orestry Program Committee Proposes 10-Year Plan for Worcester County, Mass.

A committee of eight, representing various local terests and the Massachusetts Forestry Association, s submitted a 10-year plan for the protection and habilitation of the forests of Worcester County, ass. The committee recommends that the county divided into four districts of about 150,000 acres ch and that a woodland owners' and a forest wardens' sociation be formed in each of these districts. These sociations would be in a position to employ foresters d cooperate effectively in carrying out forest protec- on, forest management, and forest utilization plans. ther recommendations include the extension of State rests to cover 10 per cent of the forest land of the unty, consolidation of public forest lands, acquisition the State of lands in districts where private owners ay be slow to apply forest management because of e fire hazard, more educational work with schools d other organizations and by preventive patrol, the stallation of adequate fire-fighting equipment includ- g power pumps and of permanent fire protection ews on State forests, the erection of two additional servation towers in the county, the acquisition by ch town of fire-fighting equipment to include at ast 12 extinguishers or hand pumps, 12 shovels, 12 ire brooms, and a conveyance for transporting men d equipment, and the hiring of a patrolman by each wn during dangerous fire seasons (from 3 to 6 weeks ch year).

The county contains 970,000 acres of land, of which bout 630,000 acres is in forest or brush pasture.

The committee estimates that there are about 50,000 acres in the county better adapted for forest roduction than for any other crop. At present the ounty has 127 factories engaged in making products f which wood is the chief material. The greater part f this wood and over 80 per cent of the lumber used building is imported from the South and the Pacific oast. The rehabilitation of the forests of the county, herefore, bids fair to be a paying enterprise on more han one count.

State forests in the county now amount to 8,942 cres; 17 towns have town forests averaging about 0 acres each; the Harvard Forest is located in the ounty; and all the cities and most of the larger towns wn watersheds or wild parks on which planting of orest trees has been done. Over 10,000 acres within he county have been planted by public and private gencies.

The objectives of forest management in the county re protection from fire, insects, and disease, the emoval of "weed" trees that are interfering with the growth of valuable species, the production of better uality of timber (the market for lower grades being poor), and the development of cooperative support in management and marketing.

The committee recommends that Doanes Falls, a group of waterfalls in the town of Royalston, and the surrounding forest, be made a public park and maintained in a natural state. The members of the committee are John E. Thayer, jr., chairman, Lancaster; William H. Wheeler, Hubbardston; Joseph N. O'Kane, Dudley; A. M. Chaffee, Oxford; R. T. Fisher, Petersham; Perley Aldrich, Winchendon; Albert B. Wells; and Harris A. Reynolds, secretary, Boston.

A Profitable Town Forest

A town forest that provides fuel for schools, timbers for local bridges and town buildings, and hundreds of cords of wood for distillation, has been owned by the town of Warner, N. H., since 1919. The tract includes 800 acres of the tops and slopes of the Mink Hills, in the southern part of the town. It was acquired, a part at a time, by the late Senator William E. Chandler, who was accustomed to spend his summers in the near-by village of Waterloo and, in accordance with Mr. Chandler's wishes, after his death was presented by his son to the town.

Mr. Chandler had improved the tract by planting old fields and building roads and trails, and it included not only areas of young growth and thousands of cords of wood but fine stands of merchantable timber. Nevertheless the gift was not accepted without warm discussion in town meeting, some of the townspeople expressing grave misgivings over the "venture." During its first winter as town property the forest supplied 100 cords of wood for the heating of the town house, library, and schools, and a cut of lumber that busied a woods crew for several weeks and sold profitably. In the second winter cuttings of hardwoods for the liberation of pine provided more than 100 cords of fuel wood, of which the portion not needed for public purposes was sold to the townspeople at less than the commercial price.

In decisions relating to the management of the forest the forest committee of the town has availed itself of the advice of the State forestry department.

Open areas on the forest have been planted with pine and spruce, and the whole tract has been protected from blister rust. The income from the forest, besides paying for this work, has built up a town forest fund of $2,200.

* * *

Lewis County, N. Y., is starting a county forest this spring. The supervisors have appropriated $1,000 for reforestation work on about 200 acres of land owned by the county, and it is planned to add to this area. Schoharie County also will begin spending a $1,000 county forest appropriation this year.

Studies of County Timber Resources in North Carolina

In order that North Carolina may know more definitely just what she can offer to industries dependent on forest products, the State's department of conservation and development proposes to undertake surveys of timber resources in counties wishing to cooperate in the work. The department offers to direct and supervise the studies and to bear the expense of preparing and writing the reports, leaving it to the counties to provide for the cost of field work. Two counties have already applied for cooperation under this plan. The State will undertake not more than six such studies this summer.

* * *

State forestry work of California during the past winter included the fireproofing of 9 miles of roads in Tuolumne County in cooperation with the Bureau of Public Roads. The slash on 50 to 100 foot strips along each side of the roads was piled and burned, and the trees were trimmed. The work was later carried to a 4-mile stretch between Sonora and Jamestown, to the Lincoln Highway between Shingle Springs and Riverton, and to roads in Fresno and Riverside Counties. In Nevada, Butte, Shasta, and Placer Counties 9,166 acres of slash were burned and snags were felled.

* * *

An act of the New Jersey Legislature of 1928 extends the State's fire permit requirements and fire protective work to salt marshes or meadowland. This legislation should serve to reduce the number of marsh-burning fires and decrease the likelihood of the spread of such fires to adjoining woodlands.

The special tax bill introduced with the purpose of acquiring land for additional State forests did not pass at the recent session of the legislature.

* * *

The Kiwanis Clubs of West Virginia have organized a forestry committee, including one representative from each club. L. L. Bennett, of Belington, is chairman. The committee will arrange for forestry talks before the various clubs and will work for forestry legislation. It will endeavor to get each club to make a forest plantation as part of the local park system or to assist in the establishment of town or community forests, and will try to interest each community in the value of forest cover for watershed protection.

* * *

On the State forests of Pennsylvania 1,840 small areas are under lease as permanent camp sites. The rentals from these sites last year totaled $16,261. Buildings that have been erected on them are valued at $1,714,730.

Straight Through the Flames

Ranger Claude N. Bilbray, of the Louisiana Div of Forestry, fought victoriously for his life with a f fire that occurred on January 14 near De Quincy He had been working in front of a fire running in grass on cut-over land. The wind, which had moderate, suddenly increased, causing the fir spread rapidly. Bilbray tried to outrun the fla but soon found that this was impossible. He de that his only hope lay in getting through the fi the burned-over ground in the rear. Holding hi against his face to protect his eyes, he fought his through the flames. He estimates that at the where he crossed the flames were 50 feet wide. cause his clothing was damp from perspiration, his gloves ignited. His hands and the sides of his were scorched, and he suffered great pain while taken to De Ridder for treatment. The experi sent him to bed for several weeks and caused the porary loss of several finger nails. Bad scars o hands are believed to be his only permanent inju

Blackfoot Association Triples Its A Under Protection

The Blackfoot Forest Protective Associatio Montana has greatly extended its scope this The association's district, which formerly comp about 1,000,000 acres lying north and west of Miss now covers a gross area of 3,000,000 acres of i mingled State, private, and Government land w and adjacent to the Missoula, Bitterroot, and National Forests.

The levy on members of the association this y 1¾ or 2 cents per acre.

T. C. Spaulding, dean of the Forest School University of Montana, acts as the association's fire warden during the summer months.

Potlatch Association Increases It Protection Personnel

An exceptionally intensive system of fire pat being provided this year by the Potlatch Ti Protective Association. The association's 56 acres of land, in the white-pine region of nor Idaho, is to be guarded during the fire season corps of 93 men. This means one patrolman to acres. In addition 55 emergency, or short-term, are provided for by the association's 1928 bu which calls for an expenditure of 10 cents per a

* * *

Blister rust control work in Vermont during included the pulling of 280,781 currant and goose bushes from 19,405 acres of land, to protect ap mately 5,900 acres of white pine.

)ne million pine seedlings are to be grown by the rth Carolina forestry division under contract for an ividual landowner of the sandhill section, Eldridge nson. According to the plan of Assistant Forester ridge the seedlings will be reared over a period of ee years. Mr. Johnson intends to plant them in southeastern section of Moore County. Experi- ntal plantings of longleaf pine seedlings from the t year's output of the State forest nursery have ceeded in that section and farther east.

* * *

)ne hundred thousand 2-year old tree seedlings have :n offered this spring by the Kentucky Forest Serv- for reforestation and watershed-protection plant- ; within the State. The species are red and white k, white ash, locust, and black walnut, and prices ige from $5 to $10 per thousand. Six thousand nsplants of ash, maple, elm, and hackberry, from 4 6 feet high, have also been provided by the service sell at 20 cents apiece for planting along highways d on school and other public property.

The kill of deer in Pennsylvania in 1927 was 14,374, of which 6,530 were shot on the State forests. Hunters on the State forests bagged 121 bear and 8 elk, and the total numbers of these animals killed in the State were 321 and 26, respectively. State records for preceding years show a rapid increase in the number of deer legally shot, from 1,939 in 1919 to 6,115 in 1922, 7,287 in 1925, and 11,646 in 1926.

* * *

In the reforesting of 4,630 acres of the New York State forest preserve last year, planting costs averaged $9.11 an acre. The expense per acre of planting individual areas ranged from $4.46 to $15.50. The largest single operation, covering 1,423 acres of Macomb's purchase, in township 20, cost $8.98 per acre.

* * *

Correction: In an item on page 4 of the March, 1928, Forest Worker, concerning the establishment of a game refuge on the Nantahala National Forest, N. C., the name of the county including the new refuge should have been given as Macon, not Marion.

Education and Extension

ale Makes Changes in Courses and Requirements

Following the news that Yale University now offers e degree of doctor of philosophy in forestry comes e announcement that the Yale Forest School is odifying its requirements for the degree of master forestry and enlarging its courses in several subjects. nder the new plan the requirements for the master forestry degree include two years' work in technical restry, one year of which must be in residence at ale; a thesis representing work of an individual aracter; and an examination covering the general ld of forestry. These changed requirements will made effective as soon as it is feasible, and the tire plan is expected to be in effect by the collegiate ar 1929–30.

Candidates for the M. F. degree will be permitted elect any courses for which they are qualified, sub- ct to faculty approval. Each student will be re- ired to devote a portion of his time to investigation some specified project, and to present his findings the form of an acceptable thesis. Students who ave already completed their undergraduate work in restry may, if they wish, devote a major part of eir time to a specified project.

Admission requirements, and the time required to btain the master's degree in forestry, remain un- hanged.

Requirements for the degree of Ph. D. in forestry include a bachelor's degree for a four-year undergraduate course in a collegiate institution of high standing, a degree in forestry, three years of graduate study, and a dissertation embodying the results of extended research and including original material worthy of publication. Not less than one year of the graduate work must be done in residence at Yale.

Candidates for the Ph. D. degree may specialize in forest production, in forest utilization, or in forest economics. A comprehensive examination in the chosen field of work must be taken by the candidate at least one year before he presents himself for the degree.

An especially important change in the courses offered by the school is the extension of work in soils. Through a cooperative arrangement with the Connecticut Agricultural Experiment Station, M. Francis Morgan has been made instructor in this subject in the Yale Forest School. Mr. Morgan will give a foundation course designed to meet the needs of forestry students and also will direct the soils work of advanced students. The course in forest entomology, also, will be enlarged. Dr. Roger Boynton Friend will give a foundation course in entomology and will direct the work of students specializing in forest entomology.

Larger opportunities for the graduate student will be afforded in the fields of forest products, forest policy, economics, and forest pathology.

Michigan School Gets More Space for Experimental Work

About 10,000 additional square feet of floor space has been made available to the Michigan School of Forestry and Conservation through an appropriation to repair the building formerly used as a heating plant for the old university hospital. Part of the basement of the building is to be used for a constant-temperature tank for experimental work in silvics; the second floor, of heavy reinforced concrete construction, affords ample space for setting up timber-testing and other machines; and the third floor has been divided into several small laboratories for forest products investigations. The old boiler room, 71 by 42 feet and about 24 feet to the rafters, provides space for the installation of wood-preservation machinery and experimental dry kilns, and even of a portable sawmill.

The location of the building is convenient for railroad shipment of timbers and material for treatment

Syracuse Students to Spend Five Weeks on Pack Demonstration Forest

Twenty-eight men in this year's graduating class of the New York State College of Forestry, at Syracuse University, will spend the last five weeks of their college life on the Pack Demonstration Forest near Lake George. There they will have instruction in field methods not only by the school's regular staff of instructors but by visiting foresters from Denmark and Switzerland. In addition to practical work in surveying and timber estimating they will lay out a working plan for the administration of the forest for the next 80 years.

Cornell Forestry Students Spend Easter Week in South Carolina Forests

Sixteen senior students in the forestry department of Cornell University visited South Carolina during their Easter vacation, as guests of the North State Lumber Co. For a week they camped in the woods 45 miles up the Cooper River from Charleston. Most of their time was spent in the logging camps of the North State Co., and they also visited the operations of the Tuxbury Lumber Co. Professor Recknagel, who conducted the party, hopes that this visit to the forests of the coastal plain may be made a regular event of the Cornell year.

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A student in the University of California has been allowed to enroll as a candidate for the Ph. D. degree with forestry as his major subject. The university this year has 11 full-time graduate students of forestry, representing 10 different institutions.

Idaho Forest Experiment Statior Organized

The School of Forestry of the University of I announces the organization of the Idaho Forest periment Station as an independent division o university. The station is composed of a fores search laboratory, the 640-acre experimental fore Moscow Mountains which the university has using for several years, and the university arbor and forest nursery. Francis G. Miller, dean o school of forestry, is director of the station, and Ernest E. Hubert has charge of the laboratory. purposes of the station are to carry on investiga with a view of bringing about better use of f lands and more efficient utilization of forest pro and to afford training to forest school students. laboratory will maintain an informational servic the lumber and related industries of the State.

The initial program of the station includes se research projects which the school has had in pro for a number of years. These are a study of I Empire Ribes in relation to blister rust control (way two years); a study in the rate of growth future yields of western white pine which has co on old burns in northern Idaho; and a study o effect of logging on the growth and form of res species in the western white-pine type of I (under way four years).

In announcing the establishment of the fores periment station Dean Miller calls attention t exceptional importance of forest industries in I About 20,000,000 acres of the land in the Stat about two-fifths of its total area, is classed as f land, and of this acreage about 48 per cent still commercial stands of timber. The annual lumbe is about 1,000,000,000 board feet. The State's ti industries have a valuation of $100,000,000, and products are valued at $41,000,000 a year. O land grants made by Congress to Idaho for the b of educational and other institutions the State owns more than 700,000 acres bearing timber st valued at $30,000,000. The University of Ida its own timber grant has a potential endowme several million dollars.

Iowa Forestry Students to Camp Idaho

This summer's annual forestry camp of the State College of Agriculture will be held near (d'Alene, Idaho. Courses will be given in applied bering, camp technique, timber cruising and map and field silviculture. More time will be give visiting and observing lumbering and logging c than in previous years.

◆

The degree of doctor of forestry is now offered b University of Michigan.

anting Stock for Nebraska Windbreaks and Woodlands

'rees for planting windbreaks and woodlands were
t out this spring to 2,500 Nebraska farmers as the
'd year's work under a Clarke-McNary agreement of
Nebraska Agricultural College with the Federal
vernment. The 700,000 seedlings required were
ed in the Government nursery at Halsey, Nebr.
planting time approached they were lifted and
ught in a refrigerator car to Lincoln. In a shed on
grounds of the agricultural college 15 students
arated the seedlings, counted them, and bundled
n in lots of 100.

'he work of shipping the trees required 10 days,
inning April 12. Since trees can be planted some-
at later in the northern and western parts of the
te, Extension Forester Watkins arranged to send the
iest shipments to the southeastern counties. The
pping tags were fastened in place on a large map of
State and were removed in geographical order,
pments going first to Richardson County in the
theast and progressively to points farther north and
t.

)rders were received from every county in the State,
kins County leading. Many came from farms of
South Platte country, where tree growing is espe-
ly difficult.

'he charge was $1 for 100 trees, plus shipping charges
n Lincoln. Each farmer was allowed not more than
trees, and the minimum shipment of any variety
s 100. It had been recommended that each order
lude one broad-leafed species. Directions for plant-
and for care during the first two seasons were sent
to each individual who ordered trees.

'he evergreens were 2 and 3 years old; the hardwoods
'e 1 year old. The evergreen species were Austrian
e, western yellow pine, Scotch pine, and Jack pine.
broad-leafed species included American elm,
alpa, cottonwood, honey locust, green ash, Russian
lberry, box elder, caragana, and Russian olive.
talpa was distributed only in the eastern part of the
te. Although maples are not hardy in the western
inties, some were ordered for trial as to whether they
thrive there with special care.

* * *

ndiana Boy Scouts are to start three 50-acre forests
s year, at Jasonville, Clay City, and Linton, on strip
l mining fields of the Maumee Collieries Co. The
npany will provide trees and tools and will give
arters to the scouts while they are doing the work.
e first plantings will include 1,200 spruce, which it is
nned to market as Christmas trees. Half the
oceeds of Christmas-tree sales will go to the scouts.

Lookout Towers as Educational Tools

Lookout towers are hardly less valuable as a means of public education than as a means of detecting and observing forest fires, in the opinion of Assistant State Forester W. C. McCormick, of North Carolina. In erecting several towers during the past year the North Carolina forestry division has developed the sites so as to take full advantage of this opportunity to appeal to public interest. Whenever possible, the tower is located near a main highway. A good road is constructed from highway to tower. A circular plot laid out around the tower is plowed, fertilized, and planted to carpet grass. The edge of the plot is marked with posts set at regular intervals, painted white with red at the base. Back of these posts, in the longleaf pine belt, are set even-aged longleaf pines. Directly under the tower the ground is covered with clean white sand and a register is provided which, besides inviting the visitor to sign his name, offers him forest fire signs and pamphlets. A circular road is built around the grass plot. On the surrounding land inflammable material is cleared away, the trees are trimmed, and parking space is cleared. In addition there are provided picnic tables, trash cans, lavatories, and a well.

A sign at the highway invites the public to make recreational use of the tower and site and the lookout man, who remains on duty on Sundays, is instructed to explain his work to all visitors.

Traveling Forestry Libraries for Mississippi Schools

Two traveling libraries provided by the Mississippi Forest Service are being routed to schools in the Pascagoula Fire Protection Area by the local district forester. Another set of books on trees and forests has been prepared by the service for the Coahoma County Library at Clarksdale, Miss., which distributes books all over the county by motor truck. The sets contain books on tree botany and elementary forestry, and stories of outdoor life. A recent report from one set shows in 21 days 110 readings. If this beginning works out well the State forest service intends to put other sets of books in circulation. In addition it is offering a list of recommended forestry books to schools and libraries wishing to add such books to their shelves.

* * *

Arbor Week observance was made easy for children of northern New Hampshire this year by John B. Eames, owner and operator of eight large movie and vaudeville theaters. Mr. Eames offered to supply white pines to be planted by school children, and offered to give a theater ticket to each school boy or girl who planted one or more white pines during the week.

Improvement Cutting Demonstrations on New York Farms

Woods meetings were held on 19 farms in 8 counties of New York State during the past winter to demonstrate improvement cuttings of cordwood. In each case an extension forester from the State college of agriculture went over the woodland with the owner and marked a sample area. Such trees as soft maple, beech, ironwood, and popple were marked to come out in order to give a better chance of development to valuable crop trees such as white ash, hard maple, black cherry, and basswood. Later the owner carefully cut and stacked the marked material, keeping a record of the time consumed by the work. At a second meeting, widely advertised in the community, the cutover area was inspected and its appearance was compared with that of the uncut portions of the woodland. The cordwood was carefully measured and its cash value in the woods was determined at a rate agreed upon by those present as reasonable. The average net return from the cuttings, which in each case left the woodland in better shape for future growth, was $59.30 per acre. On G. F. Allen's farm in Ontario County the return was more than $128 per acre.

❧

A cardboard disk to be placed back of the mouthpiece on a telephone is being distributed by the North Carolina Department of Conservation and Development. Space for the local forest warden's name and telephone number is surmounted by a red-lettered direction to report forest fires to him. The remaining three-quarters of the disk is marked into sections for the insertion of other names and numbers needed for ready reference.

Erie County, N. Y., has employed a forester for cational work. The work will be jointly supporte the county, the New York State College of Agricul and the Federal Government. Corydon D. Kingst a graduate of the New York State College of Fore has been chosen as county forester, serving unde title of assistant county agent in forestry.

❧

In 22 counties of New York State 758 Four-H boys and girls have enrolled to begin tree pla work this year. The 1927 enrollment was 568.

❧

To stimulate spring tree planting Oswego Cou N. Y., ran a contest in eight local papers offering stantial prizes for the best five reasons "why tree p ing should be encouraged on Oswego's idle acres."

❧

NOTE.—In a letter to the editor, Henry S. Gr dean of the Yale Forest School, writes that a state attributed to him in the FOREST WORKER for M 1928, in an account of the forest school conferen Berkeley, Calif., is somewhat misleading. This s ment is to the effect that "the United States has no corresponding to the so-called intermediate f schools of Europe, unless in the single instance o North Dakota School of Forestry." Dean G expresses the belief that the ranger school of the York State College of Forestry, which is organize secondary forest school, actually comes some nearer the type of institution he has in mind as necessary in this country.

Forest Service Notes

What Price Natural Regeneration?

By PHILIP C. WAKELEY, United States Forest Service

In 1927 the coast counties of Mississippi, like much of the rest of the longleaf region, enjoyed a bumper crop of longleaf pine seed. The fate of the seed in at least two of the coast counties, Harrison and Jackson, furnishes an interesting contrast to that in territories a little farther north—Pearl River County, Miss., and Washington Parish, La.

In the more northerly section seed started to fall about October 20, and in the moist weather then prevailing germinated fairly promptly. Good stands of seedlings are now observable in many places, started if not actually established.

In the more southerly section the seed fell a month earlier, during a period of drought. The crop was so heavy that P. N. Howell, of the Southern Pape seriously contemplated raking seed from burned for use in commercial reforestation. The delay i mination caused by the drought was, however, Practically the entire crop was taken by birds, a which meadowlarks were the principal offenders. December 21 half an hour's careful search by tw on both burned and unburned areas in Harrison Co where Mr. Howell had contemplated raking up showed not a single seedling established nor a sound seed, although blanks, empties, broken and crushed hulls were common. The area ined supported 10 or more excellent seed trees t acre.

What price natural regeneration in terms of prol rotation?

A Way to Develop Bushy Root Systems on Planting Stock

arge, bushy root systems that will make survival difficult for planted trees can be produced by ing layers of rich soil some inches below the surface ursery beds, according to the results of an experi- t by the Northern Rocky Mountain Forest Experi- t Station. In the Savenac Nursery, at Haugan, t., in the spring of 1924, three 4 by 12 foot nursery s were excavated to a depth of 10 inches, and ded to form six plots. In each of four plots were ed 8 inches of sand and 2 inches of fertilized soil, layer of fertilized soil being arranged at depths of , 6, and 8 inches from the surface. The fifth bed filled with ordinary nursery soil, and the sixth was ilized throughout. Western yellow pine seed were n in the six plots. At the end of the second growing on a portion of the earth was tunneled out from eath the beds and the soil was washed down from roots of 105 trees in each of the six plots. These s were fastened one by one to a board ruled with allel lines and a count was made of the roots of each -inch intervals from the ground line to a depth of 14 es.

t was found that the number of roots under ordinary sery conditions reaches its maximum at a depth of ut 5 inches, but that the layers of rich soil alter- ng with sand stimulate root development beyond maximum at that and at greater depths. The ponse of root growth to layers of rich soil manifested lf in the lower part of, or just below, the rich soil er.

t the end of the second growing season a plantation s made on a southeast slope with 400 seedlings from h of the six plots. A year later a similar plantation 200 seedlings from each plot was made on a north- t slope. At the time of planting the roots of both s were pruned to a length of 8 inches. The first ntation was handicapped by the smaller size of the es when planted, the unfavorable site, and the ught of the summer of 1926. Its percentages of vival at the end of the first year were as follows: r seedlings from the plot of nursery soil and the plot tilized throughout, 22; for seedlings from plots of d having a layer of fertilized soil 2 or 4 inches from surface, 28; for seedlings from beds of sand having ayer of fertilized soil 6 or 8 inches below the surface,

The trees planted at the age of 3 years had the vantages of larger size, a favorable site, and a moist t growing season in the field. For these the per- tages of survival at the end of the first year were, these same groups, 79, 76, and 91 respectively. us the seedlings that survived the first year after nsplanting with much the greatest success were se grown in the sand plots having layers of rich soil depths of 6 or 8 inches.

The results of this study seem to indicate that fer- izers used in growing forest planting stock should be plowed under rather than merely disked or harrowed into the soil. Some convenient way of depositing fertilizer in the bottoms of plow furrows before they are closed would be still better. Burying the fertilizer several inches underground in this way would create a greater contrast of fertility within the root zone of the seedlings, would eliminate the action of fertilizers in decreasing the effectveness of chemical treatments for the control of weeds or damping-off fungi, and would remove the danger of interference with seed germination by lumps of fertilizer materials on or near the surface.

At the Savenac Nursery the imperviousness of the subsoil prevented any serious loss of fertilizer in this experiment through downward percolation. In nurseries where soil nutrients are rapidly leached out, deep fertilization would of course involve possibility of waste.

More Gum from Fast-Growing Pines

Fast-growing pine trees yield substantially larger quantities of resin than less thrifty trees, according to figures compiled by Lenthall Wyman, associate silviculturist, United States Forest Service. Mr. Wyman's figures are based on measurements made in 1925 of the growth and gum yield of second-growth slash pine worked for naval stores under his direction at Starke, Fla. The rate of growth was determined by counting the growth rings in the outer half inch of the tree trunk. The trees were worked uniformly, with 33 streaks during the chipping season, the streaks having a maximum depth of one-half inch. The yields of gum from trees in the various growth classes were as follows:

Number of rings in outer half inch of wood	Yield of gum, in ounces
2-3	150
4-5	159
6-7	129
8-9	107
10-11	104

It would appear that with a decrease of two rings in the outer half inch there is a corresponding increase in gum yield averaging about 16 ounces. The faster-growing trees were also the larger ones, and it was estimated that their greater size accounted for about 7 ounces of this 16-ounce increment. This estimate leaves 9 ounces' gain to be accounted for by higher rate of growth.

These figures give an idea of the gains in yield of gum that may be expected of turpentine orchards when their growth rate is maintained at a high level by proper forest management. This would possibly call for the elimination of the use of fire in the management of these stands.

Railway Fusees Effective Fire-Fighting Equipment

Railway signal fusees merit a place in the standard equipment for burning slash and for fighting forest fires, according to the experience of forest officers in the Northwest who tried them out in 1927. The Pacific Northwest Forest Experiment Station, which had obtained favorable results in experimenting with the fusees in 1925 and 1926, last year distributed 2 gross to the State foresters and forest fire associations of Washington and Oregon, Federal forest officers in these States, and the forest branch of the British Columbia Department of Lands.

The fusee distributed was of the standard type, 1 by 11½ inches in size and weighing 7½ ounces. It comes in two flame colors, red and yellow, for which the manufacturers claim combustion temperatures of approximately 1,800° F. and 2,000° F., respectively. Outdoor tests of the yellow-burning fusee at the Wind River laboratory of the experiment station gave 1,950° F. as the nozzle temperature and 1,775° F. as the temperature 1 inch from the burning end.

The almost unanimous opinion of those reporting to the station on results with the fusees was that they are satisfactory in igniting light materials such as grass, needles, and duff under fair to good burning conditions. Where the fuels are damp or where relatively little fine material is present, it was found, a greater volume of heat is required than is furnished by the fusees; and to ignite logs and similar coarse material with the fusees is difficult or impossible.

The fusees were agreed to be decidedly more satisfactory than matches or pitch splinters. They were found exceptionally convenient in that they are easily carried and may be gotten into action very quickly, provide light in backfiring at night, and require no matches.

Suggestions made by the different experimenters for adapting the fusee to forest use included the elimination of the spike, packing in boxes of 20 or 25, attaching a wire handle, making the fusee larger but not longer, making it a foot longer, and supplying it with a long handle to save stooping.

The experiment station concludes that the fusee in its present form is as effective and more efficient than matches or pitch splinters in slash burning or backfiring, and may be used effectively where there is an appreciable amount of light material and burning conditions are very favorable; but that under moderate to unfavorable burning conditions where transportation is not too great a factor other means than the fusee will probably be found more advantageous. It suggests that even under burning conditions less favorable than those under which the fusee is most effective in comparison with other means of ignition, it may be advisable to use it where only a few yards or a few hundred yards of line are to be burned, especially in places difficult of access; that in addition to the size
standard a larger fusee is needed for forest use;
that the fusee should be furnished without the n
spike but with a tin ferrule crimped on the end, or
other means of attaching a handle which could b
on the ground to whatever length is desired.

Intermountain Brush Lands not Poten
Western Yellow Pine Sites

By C. F. Korstian, United States Forest Service

Ever since the national forests in the West
established, speculation and argument have w
eloquent over the general absence of western y
pine throughout the mountains of northern
eastern Idaho, and western Wyoming. Within
region many areas lying immediately below the D
las-fir type, a situation elsewhere occupied by we
yellow pine, are now occupied by brush. Not
have these brush lands failed to seed in natural
western yellow pine but most of the early attemp
establish plantations on them have been foll
by high mortality. To determine the reasons fo
state of affairs F. S. Baker (now with the Unive
of California) and the writer undertook studies in
ing analyses of climatic records and collection of
concerning the behavior of experimental planta
the distribution of precipitation, the water rela
on different sites, root development, and the tende
of plant succession in the brush lands and in the
lands to the north and south.

No significant differences in temperature or
annual precipitation were found to exist between
regions. The distribution of rainfall during
growing season in the brush lands, however, is no
different from that recorded either north or sou
them. To the north, within the temperature
suited to western yellow pine, the May precipit
is ample for the reproduction of this species. T
south, the July and August rainfall is generally
cient for natural reproduction within the we
yellow pine type. In the brush lands the ligh
of the May rainfall, which culminates very ea
the month, and the very dry weather of June, pr
spring establishment of yellow-pine reprodu
and deficiencies in July and August precipit
combined with the fact that this precipitation u
culminates in August shortly before the early au
frosts, make it impossible for western yellow
reproduction to become established in midsu
as it does in the Southwest.

The soils of the brush lands, generally calca
heavy, and fine grained, are prevailingly unsuit
western yellow pine. While the rough outlines
pineless belt are defined by the distribution of rai
the details of its boundaries are determined chie
local soil differences. On sandy soils and
streams, straggling tongues of pine timber exten

the main bodies. Even in the lands to the north south of the brush lands where rainfall and other atic factors are favorable, western yellow pine is found on certain areas characterized by heavy, -grained soils and a flat topography, as the upper ke River plains. Variations in the combination of ors influencing soil moisture, such as temperature, texture, physiography, and the presence of com-ng vegetation, also form a barrier to the extension estern yellow pine into the permanent brush lands. s is confirmed by the failure of many plants most monly associated with this species to spread far the brush lands.

he establishment of artificial stands of western ow pine on the brush lands is by no means impos-e, although generally difficult. The rainfall factors t operate against natural reproduction also tend to ke planting a failure. Planting generally succeeds on sites with moisture conditions above the average, conspicuous success has been attained only in sea-s of exceptionally heavy spring rainfall. Survival ough the first two years is determined primarily soil moisture and to a lesser extent by soil texture. rush-land sites otherwise suitable for planting with tern yellow pine in average years generally bear a sh cover so luxuriant that the competition for light for soil moisture would almost certainly cause the ntation to fail. It is often necessary, therefore, to ct essentially poorer sites where the cover is less nplete or to remove the cover before planting. s with shallow-rooted vegetation such as snow-ry and sagebrush should be avoided, as the root npetition involved signifies failure. Plantings on urally moist and sheltered sites (north and east osures) bearing stands of deep-rooted shrubs with t foliage, and on areas from which a shallow-rooted etation had been removed, proved the most suc-ful. Plantations on open brushy areas with deep-ted vegetation were less successful.

he three factors that must be considered in select- planting sites—available soil moisture, root com-ition, and amount of shade—can be evaluated with ir degree of accuracy through study of the vegeta-n on the ground.

here is no evidence that western yellow-pine stands ificially established on the brush lands will maintain mselves or spread naturally. Growth is slow and trees are apt to be short, limby, and of poor quality. s evident, therefore, that extensive planting of west- yellow pine on many of the brush lands of the ermountain region is not now justified from a nber-production standpoint.

* * *

Investigative work of the United States Forest Tax-on Inquiry in the Pacific Coast region will begin in ne, with Oregon as the key State. The field work in Lake States, begun in 1926, is being concluded this ring.

Temperature and Moisture Preferences of Forest Trees of the Southwest

Studies have been made by the Southwestern Forest Experiment Station at Flagstaff, Ariz., to determine what temperatures and what moisture conditions are preferred by various forest trees. The mountains of the Southwest offer a good opportunity for such work, because there the tree species or associations occur in well-defined climatic zones. Climatic records were taken for each of seven vegetational zones or forest types extending from the desert, at an altitude of 5,000 feet, to the upper limit of tree growth in the San Francisco Mountains, at 11,500 feet.

Coolness and moisture were found to increase consistently with altitude. The data obtained through these studies, and also the Weather Bureau records for mountain regions of Arizona and New Mexico, showed remarkable uniformity in the temperatures and precipitation characterizing the zones occupied by given forest types. The minimum temperature and moisture requirements of each species were roughly determined. For each tree species covered by the studies, it was found, the upper altitudinal limit is determined by deficiency of heat and the lower limit by deficiency of moisture.

Allegheny Station's First Experimental Forest

The first area leased by the Allegheny Forest Experiment Station for use as an experimental forest is a 500-acre tract near Medford, Burlington County, N. J., owned by Camp Ockanickon (Inc.) This organization, which represents the Y. M. C. A.'s of Burlington, Camden, Gloucester, and Monmouth Counties, N. J., has promised the station 40 years' use of the 320 acres of the property that are not actually used for camp work. Since the tract is only 28 miles from Philadelphia, it will be used as the station's headquarters forest. It shows a variety of forest conditions. The most common cover, which is present in stands varying in age from 5 to 40 years, is a hardwood mixture containing various oaks and red maple. Shortleaf, pitch, and scrub pine occur throughout the hardwood mixture and also as almost pure stands. The pine is principally young growth, but includes a few small areas of older timber. Fires have been common in the past, but only a small portion of the area has been burned as recently as five years ago. On part of the tract pine stumps 2 to 3 feet in diameter attest the size of the original stand. White cedar formerly occurred along the streams and in the swamps but has been almost entirely removed. The soils are typical of the coastal plains region, being chiefly sands and sandy loams with swamp muck in the bogs and stream bottoms. Through cooperation with the New Jersey Agricultural Experiment Station the soils of the tract are to be mapped.

Radio on the Fire Line

By Roy Headley, United States Forest Service

About the 1st of June the Forest Service will enter upon a new phase of its adventures with radio. More than a year ago D. L. Beatty, of the district office of the Forest Service at Missoula, Mont., devised a portable radio set weighing less than 7 pounds that received the voice and transmitted in code with astonishing success. Mr. Beatty was assigned to further work along this line, and during the past fall and winter has given most of his time to problems that must be dealt with before radio apparatus is adapted for use in protecting the national forests. He has visited experts and laboratories on the Pacific coast, gathering information on developments in the use of short-wave-length channels and in lightweight equipment. Now he is coming east to enlist the aid of the Bureau of Standards, the Navy Department, and the research laboratories of battery makers.

The Forest Service wishes to avoid any radio research which other agencies can be expected to undertake. It seems clear, however, that regardless of the rapid development in this field no one outside the service can be expected to make the investigations necessary to adapt radio communication to the peculiar requirements of national forest protection.

One of the troublesome questions with which Mr. Beatty will deal is that of obtaining from the Radio Commission authority to use wave lengths. It seems possible that unless the Forest Service acts promptly all the waves of all lengths will be fully occupied, with no room left for forest protection! A perplexing difficulty presents itself in the idiosyncrasies of the short waves. Some will work in daytime and not at night, others will work at night and not in daytime. Some follow the ground for 15 miles and then take a long skip; others apparently go straight up in the air and never come down again.

Everyone familiar with forest fire control work in regions where it often involves much foot travel will appreciate the desirability of a radio set light enough to be carried on a man's back with his emergency rations, enabling a fireman when he reaches a fire to inform headquarters either that he does or that he does not need help. Whether this extreme requirement for lightness can be met is uncertain; but it now appears reasonably sure that a low-power code-transmitting and voice-receiving set can be developed that will be light enough to be packed on a horse and sturdy and simple enough to be used in the thousands of trail-construction camps maintained on the national forests during the fire season. It is vital to keep these camps in communication, in order that the trail makers may be summoned to help in fighting fires, but it is practically impossible to keep them all tied in with emergency lines to the existing system of telephone communication. Trail camps move frequently, and there are too of them to permit of fully workable communi by ground wire.

While a means of keeping trail-construction in communication is the largest immediate sta which the radio research program is playin Forest Service has other important uses for equipment. It is distinctly possible that a radi pass may be employed in such a way that a fi who is not able to find his fire may learn from a l man his location and the approximate distance fire. Large fire-fighting crews are now usually to permanent telephone lines by the use of eme wire; but this arrangement, at best rather cumbe and unsatisfactory, will largely be displaced by t of radio if the hoped-for adaptation of radio bec reality.

Gray Clouds for Lightning Fire

The most dangerous lightning storms come clouds that are gray, or dust-colored, according analysis by Ranger A. T. Macnab of lookout on the St. Regis district of the Lolo National Mont. These clouds, says Ranger Macnab, ge are high and move slowly. Rain from them is heavy, but is confined to a narrow streak in the of the storm, while the lightning is heavy on the edges. When clouds are dark blue, on the co the storm is characterized by heavy rain thro its length, and although the lightning generall cedes the rain the heavy rain puts out most of th

The Missoula, Mont., district office of the Service would be glad to hear of other observati the relation of the color of clouds to lightnin precipitation.

New Method for Spreading Ammo Sulphate on Nursery Beds

A new method of treating seed beds with amm sulphate has been put into use in the Bessey N at Halsey, Nebr. The acid sprinkler used at the ery consists of a 50-gallon wooden barrel and a wide enough to straddle the beds. The barrel its bottom a lead pipe through which holes hav drilled and through which the barrel's conte spread on the seed beds as it is drawn over the preparing for the fertilizer treatment a double sack containing the required amount of amm sulphate was held over this barrel, the nozzl hose was thrust into the sack, and the wate turned on. By the time the barrel was full the of ammonium sulphate had all been dissolved, h foreign substances contained in it being left sack. The resulting solution was sprinkled ov seed beds much more uniformly and satisfa than the dry ammonium sulphate could have spread by hand.

New National Forest Purchase Areas

'wo areas in the upper peninsula of Michigan aling 400,000 acres have been approved by the Naıal Forest Reservation Commission for purchase for ional forest purposes. One of 250,000 acres surnds the Marquette district of the Michigan National rest. Nearly all of this area once supported a heavy nd of Norway pine, and the north and west portions e fine stands of hardwoods. About 79 per cent of area has been repeatedly burned and will require lanting; 15 per cent has been burned or cut over is restocking naturally. The 150,000-acre Mackinac t likewise has been largely deforested, by logging l fire, but offers excellent possibilities of forest eneration.

)ther purchase units newly approved by the National rest Reservation Commission include the Black River l Wambraw areas in the coastal section of South rolina, the Catahoula, Kisatchie, and Vernon as in middle-western Louisiana, and the Superior l Tawas areas in Minnesota and Michigan, respecely.

Purchases directly authorized by the commission this r include 23,977 acres of land to be added to estabıed national forests. Of this total 19,994 acres will constitute an addition to the Superior National Forest, 3,960 acres will enlarge the Michigan National Forest, and 23 acres will be added to the Monongahela National Forest for use as a nursery site.

How Many Seeds to the Pound?

The weight of forest tree seed varies considerably in different annual crops and even in different localities. Records for a number of years kept by D. S. Olsen, chief of planting in the Northern Rocky Mountain National Forest District, show the following numbers of seed per pound:

Species	Range	Average
Western white pine	24, 720–28, 802	26, 657
White-bark pine	2, 784	2, 784
Limber pine	5, 610	5, 610
Western yellow pine	[1] 8, 510–9, 671	9, 090
Engelmann spruce	210, 964–230, 600	222, 753
Douglas fir	36, 014–44, 950	41, 168
Western larch	129, 861–174, 450	154, 643
Western red cedar	245, 165–362, 872	303, 482
Mountain hemlock	207, 910	207, 910
Western hemlock	274, 875–323, 999	299, 437
Alpine fir	51, 262	51, 262
Lowland white fir	23, 858–44, 270	34, 064

[1] Figures given are for western Montana seed. That collected in the Black Hills of South Dakota runs as high as 18,000 to the pound.

General Forest News

Major Forestry Laws Enacted

The McSweeney-McNary bill to establish a definite licy for forest research in the Department of Agriture and to codify existing Federal forest research gislation was approved by the President on May 22, ving been passed by both houses with only slight endments. This law authorizes a 10-year program forest research in the Forest Service, the Bureau of ological Survey, the Bureau of Plant Industry, the ıreau of Entomology, and the Weather Bureau. It ovides for annual appropriations not to exceed total of $3,225,000. It also authorizes a total of ,000,000 for a survey of American forest resources.

The McNary-Woodruff bill was approved as law by e President on April 30. The law authorizes the propriation of $2,000,000 for the fiscal year beginng July 1, 1928, and $3,000,000 for each of the two cceeding fiscal years, to be used in acquiring lands r forest purposes under the Weeks law as it has been ıended by the Clarke-McNary law.

The Agricultural Appropriation act as approved by e President on May 16 contains the same appropriaons for the Forest Service that were provided for y the bill as it passed the House, except that an additional $10,000 is allowed for the purchase of tree seeds, nursery stock, etc., and the forest road item has been increased by $1,000,000.

Flood Control Committee Indorses Forestry Program

The report of the House Committee on Flood Control, submitted by Chairman Frank R. Reid on March 29, reads in part as follows:

> The committee indorses the position of the Forest Service as brought out in the hearings by statements of Col. W. B. Greeley, Chief of the Forest Service; Associate Forester E. A. Sherman; Dr. Raphael Zon, director of the Lake States Forest Experiment Station, and many others, that the consideration of forest cover on certain critical watersheds in the Mississippi Basin is essential in a comprehensive plan for flood and erosion control, as a supplement to engineering works.
>
> Hence the committee recommends for special consideration by the appropriate committees of Congress, legislation or appropriations designed for—
>
> 1. The acquisition of national forests upon critical watersheds in the Mississippi Basin and the protection or restoration of forest cover on such areas.
>
> 2. The extension of adequate fire protection to all forest lands in the Mississippi watershed by the Government in cooperation with the States concerned.
>
> 3. Greater Federal effort in producing and distributing forest planting stock for the reforestation of denuded or waste lands and submarginal farm lands in cooperation with the States.

4. All possible emphasis upon extension work in forestry among owners of farm woodlands in the Mississippi Basin to promote the proper care, management, and use of farm woods and wood lots in cooperation with the States; and the expansion of this cooperative service to include all classes of private forest lands.

5. The investigation of forestry and other methods of erosion control on badly eroded areas in the Mississippi drainage.

The 1927 Flood Damage to Young Hardwoods

By G. H. LENTZ

In the course of investigations by the Louisiana Department of Forestry and the Southern Forest Experiment Station it was noted that the high water of the 1927 Mississippi flood had caused serious damage to the young growth and the hardwood reproduction throughout a considerable part of the hardwood bottom-land type. Where the flood water stood for any considerable length of time and where it was deep enough to cover the trees, it generally caused their death. Saplings too tall to be more than partially covered by the high water had their lower branches killed and their growth retarded in proportion to the loss of crown. Trees whose crowns were entirely above the high-water line have shown no indication of damage from the flood.

Young trees were killed by the flood waters in East and West Carroll, Madison, Tensas, Concordia, Catahoula, Richland, Franklin, and Avoyelles Parishes. The species were various oaks, red gum, hickory, ash, and elm. Outside the Mississippi levee the willows and cottonwoods seem to have suffered no marked damage even though they were under water for a considerable period of time. Some of the lateral branches were killed, but new branches from dormant buds have taken their place.

Owing to the damage from forest fires which occurred so generally in 1924 it was difficult to find areas on which to observe damage by flood only. Three separate areas showing little or no signs of fire were found in Madison Parish and were closely studied. Survey strips were run through each of these areas and detailed records were taken to determine the extent of flood damage. The flood water remained on these areas for about three months. The depth of the water ranged from 8 to 20 feet and the proportion of trees killed varied accordingly.

Of the 458 trees examined on these areas 60 per cent had been killed. All the trees that were entirely covered by flood waters were killed and the less thrifty trees that were partially covered also died. In the case of the ash, gum, and elm the roots as well as the main stem were dead, but the hickory and occasionally an oak have sent out sprouts from dormant buds. These sprouts could hardly be called thrifty, and it is doubtful if they will produce thrifty trees.

The combined effect of the flood and the 1924 fires has left most of the hardwood lands with very little growth under 10 years of age.

A Possible Means of Larch Sawfl Control

By SAMUEL A. GRAHAM, United States Bureau of Entomolog

Finding a means of protecting tamarack from
ravages of the larch sawfly is one of the most ur
entomological problems in the Lake States. In
vast areas of swamp forest in that region the futu
tamarack in any forest management plan woul
assured if it were not for the continued menace of a sa
outbreak; for tamarack grows more rapidly and re
duces itself more easily than any other swamp

The University of Minnesota undertook the s
of the sawfly many years ago. The Bureau of E
mology joined in the work in 1923, the Universit
Michigan six months ago. These studies are begin
to bear fruit and it is now possible to make some
tical suggestions for the control of the pest.

Experiments with cocoons placed in a tama
swamp on the surface of a sphagnum hummock
in sphagnum moss 2 inches below the surface, an
high ground on the surface of tamarack needle li
beneath the litter, and buried in sand, indicate tha
best of these locations for sawfly hibernation is b
the surface of sphagnum moss, where from 32 t
per cent emergence occurred. On high ground there
either no emergence or a very low emergence, exce
one case in which 29 per cent emergence occurred
cocoons buried 1½ inches in sand. Since in na
the cocoons are seldom found buried in mineral
this exception has little significance. These data indi
that on high ground the larch sawfly may not be su
serious menace to the tamarack as it is in the swa
They also suggest the possibility of so treating
swamp forest by drainage or flooding that hiberna
conditions for the sawfly may be made less favor

The importance of biotic factors in the control o
larch sawfly has been recognized for many y
but the results of experiments in the Lake St
indicate that our ideas of the relative importanc
insect parasites, diseases, and small vertebrates
be somewhat modified. We have usually tho
of the insect parasites as being the most impor
factor and the vertebrates as being the least impor
in reducing the number of sawflies while the ins
are in the cocoon. Our observations indicate that
percentage of cocooned sawflies killed by para
is seldom more than 15 per cent and is as a rule ne
5 per cent, and that those killed by disease run f
3 to 10 per cent. Those eaten by mice, howe
run on the average from 50 to 80 per cent.

Our experiments have also shown that in pl
where the ground cover is most varied and food
mice is most abundant the percentage of coc
opened by mice is likewise larger. On the high gro
where the mouse population is apparently still
dense than in the swamps it is often impossibl
find a single cocoon that has been opened by
normal emergence of the sawfly.

All these facts suggest the possibility of protecting arack forests from the attack of the sawfly by proving conditions for the mice, and thus increasing effectiveness of these animals as a control agency. rom the results of the experiments it is evident t superficial drainage of tamarack swamps offers ossible means of reducing the probability of larch fly outbreaks. Disregarding the fact that such atment would probably stimulate growth and s make the trees more resistant to the effects of oliation, there are two ways in which sawfly abunnce is likely to be affected by drainage. In the first ce the surface character of the soil may be changed that it becomes less favorable for sawfly hibernation. the second place it is doubtless a fact that in drained amps the character of the ground cover will be much dified and will become more diversified. Such hange would mean more favorable food conditions the rodent population and greater effectiveness awfly control by these animals.

he Rôle of Microorganisms in the Transformation of Organic Matter in Forest Soils

om paper given by S. A. WAKSMAN, Rutgers University, at the ecember, 1927, meeting of the American Association for the Advanceent of Science]

A detailed study has been made by the New Jersey ricultural Experiment Station of the chemical nature the organic matter in forest soils and of the decomsition of oak leaves under aerobic and anaerobic nditions by microorganisms. The plant residues ded to the soil in the form of various tree products h as leaves, needles, twigs, and fruits consist of a mber of organic complexes including various celluses, hemicelluloses, lignins, resins, tannins, and nitroous and other constituents. In the decomposition these various constituents a number of organisms ke an active part. Some of these organisms attack marily the water soluble substances; others can dempose readily the celluloses and hemicelluloses; ile still others, largely Basidiomycetes, are capable attacking the lignins. The decomposition which ds to the formation of the so-called forest humus considerably influenced in rapidity and kind by e reaction of the soil and the presence of available rogen.

Green oak leaves tested in the laboratory after six nths under aerobic conditions showed the following anges. More than half the organic material had appeared. Water soluble organic matter amount- g to 44.04 grams in the original leaves was reduced 10.52 grams; hemicelluloses from 25 to 6.62 grams; luloses from 31.84 to 6.01 grams; lignins from 41.34 38.20 grams; crude proteins from 18.36 to 9.37 ams; and the ether soluble portion from 9.5 to 2.31 ams. After a year of decomposition less than oneird of the organic matter was left. Under anaerobic nditions the decomposition was considerably slower. Under such conditions the celluloses and hemicelluloses, the ether-soluble substances, and the lignins decompose more slowly. The water-soluble matter, however, decomposes as rapidly under anaerobic as under aerobic conditions.

A detailed study was made of the chemical composition of the humus of three forest soils taken at Mount Desert Island, Me., including a hardwood spruce forest, a mixed coniferous and deciduous forest, and a spruce forest with a growth of hypnum moss, and the composition of this humus was compared with that of the humus formed under controlled laboratory conditions. The comparison brought out definitely the similarity of the processes of formation of organic matter in nature and in the laboratory from the same or similar plant products. The difference in the composition of the original material, in the environmental conditions under which decomposition of the natural organic materials took place, and in the microorganisms which brought about the decomposition processes, no doubt account for the slight difference in the resultant humus.

The results of these studies indicate that the humus is made up of (1) a number of the residual constituents, such as the celluloses, hemicelluloses, fats, and waxes of the various plant products (leaves, twigs, roots, mosses, etc.) which are undergoing decomposition; (2) the constituents of the plant products which are more or less resistant to decomposition, such as the lignins, cutins, tannins, and resins; (3) the microbial cells (fungus mycelium, spores, bacterial cells, protozoa, worms, etc.) synthesized in the process of decomposition of the natural organic materials continuously added to the soil; and (4) the products of decomposition of the natural materials and cell products, such as organic and inorganic acids and ammonia.

Methods have been developed which allow us to make careful analyses of the chemical composition of the organic matter in forest soils and to compare this composition with that of the plant remains which have given rise to this "humus." The use of alkalies for extracting the various "humic acids" from the soil is undesirable, since this method does not bring out the nature of the organic complexes in the soil.

Scale Formula Gives Scribner Decimal C Results

A formula giving results practically identical with those of the Scribner Decimal C scale rule has been developed by C. E. Knouf, of the Weyerhaeuser Scaling Bureau, as follows: Square the average diameter of the top end of the log inside bark, subtract from this product the average diameter multiplied by 3, multiply the remainder by one-half the length, and point off the right-hand figure. Algebraically expressed, the formula is $\frac{(D^2-3D)\ \frac{1}{2}L}{10}$. For a log 20 inches in average diameter and 16 feet long this formula gives the contents as 272 feet. The Scribner scale gives 280 feet.

An Experiment in Insect Control in Western Yellow Pine Line Slash

By Hubert L. Person, United States Bureau of Entomology

How the control of injurious forest insects is affected by different methods of disposing of "line" slash of western yellow pine, cut in clearings for power lines, roads, etc., is suggested by the results of an experiment recently carried out by the writer. This question is one of a number of entomological problems in connection with the disposal of slash of this species still requiring solution, although it has been fairly well established that, in general, western yellow pine slash is not a serious menace as a breeding ground for primary forest insects. This work, in which the California Forest Experiment Station cooperated, was undertaken primarily to determine how far the Forest Service should go in its demands for treatment of line slash cut on national forests by California power companies. The experiment was limited to trees cut in the lower western yellow pine belt of California during April and May.

The felled trees were attacked during the first season by four insects or insect groups: the western pine beetle (*Dendroctonus brevicomis*); the confused engraver beetle (*Ips confusus*, Lec.); flat-headed borers, principally Melanophila spp.; and roundheaded borers, principally Graphisurus spectabilis, Lec. Of these the western pine beetle is the only typically primary forest insect. The confused engraver beetle, which is occasionally primary, is the only other insect considered in the study.

The five methods of disposal tried, and the results from each, are as follows:

I. The trees were felled only, the limbs and bark being left intact. The western pine beetle attacked 25 per cent of the total bark area. The brood development of this insect was greater than in any of the other slash groups, but much less than in standing trees. The number of western pine beetles that emerged exceeded the number that attacked by 2.6 per square foot of bark surface.

II. The trees were felled and the limbs all cleared away, leaving the trunk exposed. The western pine beetle attacked 30 per cent of the bark area, and the engraver beetle attacked 8 per cent. The number of western pine beetles that emerged was less than the number that attacked by 10.5 per square foot.

III. The trees were felled and limbed and the trunks were covered with brush. The western pine beetle attacked 38 per cent of the bark area. The brood development was greater than in Group II but less than in Group I. The number of western pine beetles that emerged was less than the number that attacked by 6.6 per square foot. On 28 per cent of the bark area a fairly large engraver beetle brood developed.

IV. The trees were felled, limbed, covered with brush, and burned within two weeks. The fire scorched 32 per cent of the inner bark area. Most of the remainder of the area was unfavorable for bark beetle development. The western pine beetle attacked 4 per
of the bark area, and the engraver beetle attacked 6
cent. The number of western pine beetles that emer
was less than the number that attacked by 3 per sq
foot.

V. The trees were treated in two ways. Four t
were felled and limbed and the lower half of the tru
covered with brush. The upper half was left expo
Two trees were felled and limbed and the lower
covered with brush and burned. The burned
exposed parts had very little bark beetle work, and
covered parts were too moist for good brood deve
ment. The western pine beetle attacked 22 per cen
the bark area, and on 33 per cent of the bark area a
brood of the engraver beetle developed. The num
of western pine beetles that emerged was less than
number that attacked by 9 per square foot.

The following table permits comparison of the n
bers of western pine beetles attacking and emerg
for the different slash groups and for normal stan
trees killed by the beetle during the period of the st

The relation of attack to emergence of the western
beetle; normal standing trees and five slash groups

	Number of individuals of the western pine beetle per square foot		Increase decrease square fo	
	Attacking	Emerging	Number	I c
Standing trees	27	81	+54	
Slash:				
I. Felled only	17.7	20.3	+2.6	
II. Felled and limbed	13	2.5	−10.5	
III. Limbed and covered	12.4	5.8	−6.6	
IV. Limbed and burned	8	5	−3	
V. Given mixed treatment	9	0	−9	

It is evident that the attack on slash did not c
any increase in the infestation. Even in the cas
Group I, the trees that were felled only, the increas
effective progeny of 2.6 per square foot would prob
be more than offset by the mortality during fli
Apparently the survival in the broods of the be
feeding on slash is so much lower than that from be
feeding on standing trees that the effects of an at
upon line slash must be toward a decrease rather
an increase of the total infestation.

For most situations in the lower western yellow
belt it is recommended that either method II or me
IV be used. These two methods result in high
tality in broods of the western pine beetle comb
with small percentages of area attacked by the engr
beetle (8 per cent and 6 per cent, respectively), an
tend to improve the forest insect situation in an
rather than create a menace. Method II, in which
trees are felled and limbed only, should be used w
ever burning of the slash can not be completed wit
month from the time the trees are felled (i. e., be

e broods have a chance to develop and emerge). It most effective on open sites where the logs can be posed to full sunlight. Method IV, in which the ees are felled and limbed and the brush is burned over e trunks, is the surest method when the burning can completed within a month after the trees are felled, pecially on north slopes and in shaded situations here the logs can not be exposed to direct sunlight.

An Economic Study of Land Use in West Virginia

The interest of various Federal and State agencies the problem of planning for efficient use of lands at are now idle or are being used unwisely is exempli-ed by a survey now being made in the mountains of utheastern West Virginia by the United States ureau of Agricultural Economics, in cooperation ith the West Viriginia Agricultural Experiment tation and the United States Forest Service. In that gion, which has been settled for 100 years or more, griculture has always been of the self-sufficing type. uring the last half century it has been closely linked ith forest industries, which furnished employment nd cash income. The bulk of the timber has now een cut, and what is left can not last long. Farming o longer pays, on much of the land, and many fields re being abandoned, while at the same time the urden of carrying cut-over land is pressing heavily n the owners. The problem of future land utilization the region is, therefore, of urgent interest from both e private and the public standpoint.

The forester's task is to determine the economic racticability of utilizing various types of land for orestry, either by private owners or by public agencies, nd in cooperation with agricultural economists to scertain the relative values of different sorts of land or agriculture and forestry, under existing economic onditions or those likely to prevail in the near future. t is hoped that the study will lead to the formulation f a program for coordinated, permanent agricultural nd forestry utilization of lands in the region.

The collecting of the necessary physical and economic ata was begun last summer, and will be completed this ear. Information is being gathered from farmers, andowners, and various wood-using industries. Detailed data on composition, growth, condition, and wnership of the forests is being obtained chiefly by means of sample plots scattered throughout Nicholas nd Webster Counties on various soil and land types. Inquiry is also made into the local methods of taxation nd the amount of tax burden on both farms and forests, in order to ascertain the effect of taxation on land utilization.

This study is probably the forerunner of a number of similar projects to be undertaken later in other portions of the country where there are large areas of unutilized land.

A Suggestion for the Use of Tables of Basal Areas

By DONALD BRUCE, United States Forest Service

Anyone who has occasion to make frequent use of a table of basal areas will find it profitable to enter this table on his slide rule. Slide rules may be purchased that have two of the scales blank and that are, therefore, particularly convenient for this purpose; however, room can ordinarily be found on almost any pattern.

All that is necessary is to scratch a series of graduations on the outer edge of the rule opposite the basal area values taken from a basal area table, and number each with the corresponding diameter. Values from 1 to 10 are all that are needed (if $\frac{1}{10}$-inch intervals are used), for 11 and 1.1 are the same except for a shift of the decimal point. In many rules, however, the resulting series of graduations will be double the length of the rule, so that it will be necessary to use two edges to complete it. The precise details of the arrangement vary so widely with the type of rule used that it is impracticable to explain them explicitly. It is advisable to work the arrangement out in pencil and not scratch in the graduations until the most convenient layout has been found.

In use, the end of the slide may be set opposite the graduation for any desired diameter by using the runner. The rule is then in position for multiplying, and the total basal area for any number of trees of that diameter, or the volume of a cylinder having any given length, can be read in the usual way as a product. The position of the decimal point can be supplied by inspection.

Transplants Treated With Compressed Air

Compressed air forced in among the roots of large trees that have been transplanted is found to assist the trees in recovering from the operation. This treatment has been tried out by a commercial firm of Cleveland, Ohio. It was suggested to them by botanists of the Ohio Agricultural Experiment Station, on the theory that difficulty in getting large trees to survive transplanting is due to suffocation of the roots. The air is supplied through a nozzle so designed that it can be forced deep into the soil. The treatment effects an almost immediate revival of trees that have not shown a vigorous recovery after transplanting. It has also proved stimulating to trees on lawns, where, apparently, the roots of the densely matted grasses making up the sod sometimes release so much carbon dioxide in respiration that the supply of oxygen in the soil is dangerously reduced. It could possibly be extended to street trees, which suffer greatly from the leaking of gas mains and from soil compactness due to paving.

Snakes and Snake Bites

By Will C. Barnes, United States Forest Service

Forest officers, cowboys, sheep herders, and others constantly "out in the open" generally become accustomed to the thought that reptiles are part and parcel of our forest population and, with very few exceptions, are absolutely harmless and quite as interesting in their ways as any of the other wild things of the woods. Many persons unaccustomed to camping out, however, consider it absolutely necessary to carry around with them every available means of protection against the attacks of reptiles that mean them no real harm and for the most part ask only to be let alone. The whole snake family is paying the penalty for the single act of one ancestor. It was the serpent that got our original parents into trouble and sent them in disgrace out of the Garden of Eden. Ergo, everyone takes it out on snakes, whether it be the pretty and absolutely harmless little garter snake or the huge, surly, quick-tempered, diamond-backed rattler of the Florida swamps.

First and foremost among snakes comes, of course, the rattler. We have three other poisonous snakes, the moccasin, the copperhead, and the coral snake; but their habitat covers a comparatively limited area of the United States, while the rattler, according to Dittmars, is found from the Gulf to the Canadian boundary and from the Atlantic to the Pacific. Only in Maine and New Hampshire is he absent. He seems to be quite as much at home in Montana as in Florida. He enjoys the desert air of southern Arizona as well as the humid climate of the South Atlantic coast. You will find him below sea level in the Death Valley country of California and again high above timber line all over the Rockies.

No census figures show the number of rattlesnakes in our country, but there are plenty of them in every region. When you consider that our national forests were visited last year by more than 10,000,000 people, a large majority of whom camped out and tramped over the country fishing, hunting, picking wild flowers, taking pictures, and exploring every reachable nook and corner of these vast areas, the number of persons attacked by these reptiles seems practically negligible. And the fatalities on the national forests from this cause can probably be counted on the fingers of one hand.

Figures as to numbers of persons bitten by rattlesnakes are not complete. The Texas State Journal of Medicine records that in 1926 there were 150 deaths in the entire United States from this cause, of which 17 occurred in Texas. In that State, in 1926, 60 persons bitten by rattlesnakes were examined and studied. Nine of the 60 died. On that basis probably about 1,600 persons were bitten in 1926 in the whole country—not a large number out of a population of more than 120,000,000.

The effect of a rattler's venom is to coagulate the blood and slow down its circulation. If the poison does not get into the venous system no harm results. This is why hogs are never killed by rattlers. Their venous system is protected by a thick layer of through which the poison does not penetrate. T is also the reason why many persons struck by ratt do not die or suffer any serious harm—the venom d not reach a vein.

Up to a comparatively short time ago alcohol considered the one remedy for the bite of a ratt So when planning outings everybody provided ple of whisky. Then scientists discovered that in a c of rattlesnake bite the action of whisky in stimulat the circulation was about the worst thing that co happen—the poison was the more rapidly carried i the venous system. So whisky as an antidote rattlesnake bites was declared taboo.

About that time some chemist started the idea using permanganate of potassium, and for the l 15 or 20 years this has been the approved reme Kits for its use have been sold everywhere and th sands of people, including forest rangers, are to-c carrying around these permanganate of potassi kits, firm in the belief that in this way they are fu protected against death from rattlers.

And here in the last year or two come a new bu of scientists who tell us we are all wrong and that p manganate is useless as a protection and positiv injurious to the patient. They say that the perm ganate causes a sloughing away of the flesh arou the spot where it is injected, resulting in serious so that cause the patient severe suffering.

The latest and most successful method of count acting the effects of snake venom is the use of a venin, or antisnake-bite serum, a concentrated ser derived from horses that have been dosed with ven from rattlesnakes. This is the result of years of vestigation by Brazilian Government officials w have made most detailed studies of this matter. is issued under license from the United States Pu Health Service, in small convenient packets w syringe and full instructions. The results of h dreds of experiments on both humans and anim carried out under the direction of the Antive Institute of America, seem to prove conclusively value of this latest method. During 1927 an expe ment station located at San Antonio, Tex., was unu ally successful in demonstrating its value in a la number of cases of persons bitten by rattlers. December, 1927, the Surgeon General of the Unit States advised the Forest Service as follows:

> A very interesting article on first-aid treatment for snake bites be found in the Texas State Journal of Medicine for July, 1927. T article we believe pretty well disposes of the contention that perm ganate of potassium is of value in the treatment of snake bite. * * It is believed that it would be of distinctly more value to make incisi at the site of the wound made by the bite of the serpent and to ap suction either mechanically or by the mouth. With regard to antive there is experimental evidence that it is of value—just how much va under clinical conditions one could not say. * * * The materia readily applied by any intelligent person.

By mechanical suction is meant the use of sm affairs called breast pumps, which are readily obtain any drug store and doubtless make a better job of e withdrawal of the venom than the mouth, without e danger to the person whose mouth is being used.

And so permanganate of potassium follows whisky o the closed files and its place is taken by this new tivenin.

How a Virginia Farmer Handled His Woodland

By Gordon Furr, United States Forest Service

In 1920 a friend of mine bought a small farm of 47 res in Fairfax County, Va., 6 miles southwest of exandria. There are 22 acres of cleared land and of white oak, pine, and poplar timber with a few ust trees. In 1921 he cut 60 cords of the oak and ne for fuel wood at a cost of $1.50 per cord. The rket price of this wood, delivered at the side of the d, was $11.50 per cord. After all had been sold he ured he had made a clear profit close to $600 and had ent most of his time either taking orders or doing her things about the place.

The following year he had 100 cords more cut, at $2 r cord, which he sold to a Washington firm for $11.50 r cord. This time he didn't have to take orders, it emed as though dealers everywhere wanted the wood. ter selling he again took his pencil and figured his ofit to be around $900.

The last time I was out there I took a look at the odlands. There is a good growth of young timber d I am sure in a few years it will look as if no great nount had been cut.

When this man purchased his farm he did not count n his wood, but rather on trucking and chickens. fter rather bad luck with an acre of cantaloupes and erything else in the trucking line, he started to gure how he was going to meet his second payment. hanks to the timber, within a year after he bought e farm he paid off one note and when the next one me due his best friend, the forest, had come to his scue again. Last year a pulp mill in Georgetown, . C., wanted to contract for the poplar, but I think e will wait for a little while before selling any more.

Pruning White Pine in Maine

In pruning white pine W. B. Deering, of Hollis enter, Me., gets good results with a 17-gauge steel w blade about 18 inches long, 3 inches wide at one d and 2 inches at the other. There are 4 teeth to e inch, set so as to cut with a downward pull, and e saw blade is fastened to a 10-foot pole at an angle f 30°. Mr. Deering prunes only dead limbs from the 6-foot butt log. He states that with this tool a man n prune a tree in from 2 to 4 minutes, or about 100 nning feet of tree trunk in an hour. This means a te of about seven 16-foot logs per hour and a cost of bout 8 cents per tree.

Long-Bell Co. Gathers Pine Seed for Planting

In preparation for this spring's sowing the Long-Bell Lumber Co.'s forces at De Ridder, La., gathered 12,000 pounds of pine cones—8,000 of longleaf, 3,000 of loblolly, and 1,000 of shortleaf pine. When dried in a lumber shed in the Ludington mill the cones yielded clean seed in the proportion of 3 pounds of seed from 100 pounds of green cones. It was planned to sow these seed in 200 beds, 12 by 24 feet, from which the company's foresters hope in 9 or 10 months to transplant 1,000,000 seedlings.

For field planting this spring the company had ready in its De Ridder nursery 15,000 loblolly pines. Supplementing these with stock from the State nursery, it planned to plant 150 acres. The quota at which the company aims in 1929 and succeeding years is 1,000 acres. The company had previously established two plantations in the neighborhood of De Ridder, one made in 1926–27 and one several years older in which the trees are now from 4 to 10 feet high.

Several thousand seedlings of Pacific coast species are being grown by the company for experimental planting in Louisiana. These include redwood, Port Orford cedar, and Douglas fir.

Arkansas Citizens Volunteer to Protect Ouachita National Forest

Appreciative neighbors of the Ouachita National Forest, Ark., have voluntarily organized to give it free protection from fire. Citizens of Sugar Grove, Ark., at a meeting held March 3 formed a forest protective association primarily for the purpose of preventing and supressing forest fires near and on the Ouachita National Forest. The agreement to fight fires without charge was signed by 72 men, who were organized into four groups headed by "Ouachita National Forest fire wardens."

* * *

A 3,000-acre fire in the strawberry belt of southeastern Louisiana, occurring late in January, caused considerable losses by destroying large quantities of pine "straw" in the woods. Huge quantities of pine straw are used every year as a protective covering for the strawberry beds. Loblolly pine straw is used in preference to that of longleaf pine because it rots quickly and practically disappears by the end of the summer. Wood-lot owners in this section sell their yearly fall of needles at prices ranging from $3 to $7 per acre and averaging about $4. Their woods are kept remarkably clean, all hardwood brush, fallen branches, and other débris being gathered in piles before the straw is raked together to be carried to the fields.

Wisconsin Commercial Forestry Conference

The speeches and floor discussions at the Wisconsin Commercial Forestry Conference, held at Milwaukee, March 28–29, indicated that the time is ripe for placing forestry on a much sounder footing in the State. Many influences distinctly favorable to forestry in the State manifested themselves and the desirability of forestry activity by the counties, the State, and the Federal Government was recognized.

A more general application of the forest crop law was regarded by the conference as a desirable thing. At the time of the conference 65,000 acres had been listed under the law and applications known to be pending amounted to about 200,000 acres. Extension of the economic survey over the forested area of the State was advocated. This would provide a basis for determining the best economic use of such lands. Stress was laid on the desirability of reforestation and of getting technical advice on management. Governor Zimmerman in his address expressed the hope that ultimately Wisconsin would own two or three million acres of State forest.

The conference brought out the fact that a change has taken place in the feeling in the State with regard to the use to which cut-over lands can be put. There appears to be a growing and rather general recognition of the fact that a great deal of the land in the State is not suited for agricultural use and that attempts to colonize it result in economic losses. The recognition of this fact paves the way for a sound program of land economics that will include forestry as a major activity. Great interest was manifested in the recreational value of forests and in their importance in the perpetuation of wild life. It was stated that recreational activities in the State bring in a revenue averaging about $100,000,000 a year.

The conference program was arranged to cover discussions of the land and forest situation in Wisconsin, what forests mean to the public and the various industries, fire protection, forest utilization, forest taxation, reforestation, farm timberlot forestry, and the part to be played by public and private agencies in handling the forest lands of the State.

White Pine Blister Rust Regulations Modified

Because of the spread of the white pine blister rust in the Pacific Northwest, changes made in the quarantine regulations add Idaho to the list of States designated as infected and the counties of Clackamas, Hood River, Multnomah, and Wasco to the territory in Oregon to which special restrictions apply. Details of the changes are given in "Amendment No. 1 to Revised Rules and Regulations Supplemental to Notice of Quarantine No. 63," issued by the Federal Horticultural Board.

Cigar and Cigarette Fire Hazard

In an article in the January number of the Quarterl of the National Fire Protection Association, P. D. Sa and F. M. Hoffheins, of the United States Bureau Standards, give the results of fire-hazard tests mad with 9 brands of cigarettes and 11 brands of cigar The tests were made by placing the lighted cigar cigarette butt in a dry grass pad attached to a scree Some tests were made in still air; others with wind various velocities generated by a small electric fa The tests were made with grass pads of various de sities, from 0.032 to 0.099 gram per cubic centimete From measurements of butts found on concrete floor pavements, and bare ground where, according to t experimenters, the thrown butts usually go out witho further burning, it was estimated that the avera cigarette butt is about 1¼ inches long; so half-leng cigarettes were lighted and burned down to 1¼ inch for use in these tests. Cigar lengths used in the tes ranged from the whole to any length sufficient for r lighting and testing.

In 50 tests each with cigars and cigarettes in st air no ignition of the grass pads took place. In cigarette tests in a wind of 1 to 3 miles per hour t ignitions amounted to 41.2 per cent; in 95 tests in 3 to 4 mile wind ignitions were 85.3 per cent; in tests in a 4 to 5 mile wind, 50.8 per cent; and in tests in a 5 to 8 mile wind, 57.7 per cent. In 54 cig tests in a 1 to 3 mile wind the ignitions were 18.5 p cent; in 37 tests in a 3 to 4 mile wind, 8.1 per ce in 63 tests in a 4 to 5 mile wind 25.4 per cent. Wi higher wind velocities the ignitions increased to 3 per cent in 84 tests in a 9 to 12 mile wind, which w the highest in all the tests that were made. Cigaret took from 19.2 to 33.5 minutes to burn their f length; cigars from 2.3 to 5.17 minutes. The avera time the 1¼-inch test pieces of cigarettes took ignite the pads was 9 minutes 33 seconds in a 1 t mile wind, 4:47 in a 3 to 4 mile wind, 5:39 in a 4 t mile wind, and 4:48 in a 5 to 8 mile wind. The cig took on the average for the various wind velocities a lengths all the way from 1 minute 18 seconds t minutes and 28 seconds.

Since the national consumption of cigarettes is n near 90,000,000,000 and that of cigars 7,000,000, a year, and since the percentage of ignitions for ci rettes is about three times that for cigars, the relat potential hazard is about 40 to 1. In either case hazard is large; for with air currents "of pro intensity" ignitions were consistently obtained over 90 per cent of the trials with plain cigarettes in from 10 to 40 per cent of the trials with cigars.

Tests made with cigarettes having tips of c added cigarette paper, or writing paper showed hazard to be reduced on the average to 50 per c by the use of ½-inch tips, to 20 per cent by ¾-i tips, and to less than 10 per cent by 1-inch tips.

Foreign Notes

hat a German Forester Can Learn in America

By H. F. von Maltzahn, Mecklenburg States Service

What can a German forester learn in America?" s was the most frequent question the writer had to wer while traveling through the United States and nada.

et's take it another way around: What do we ropean foresters *want* to learn, when we come to erica?

Ve are not looking for applied silviculture. Even ve were, I only need to mention one word: Peters- n! Some Europeans may be especially interested your American technical development, in the tools, chinery, and methods you use in nurseries, sawmills, l logging operations; and their visit will be worth ile as long as they remember that different trees uire different logging tools and different conditions ferent methods. Others may come and study your est research work. Visiting your forest experiment tions they will see that the problems handled there e very often far ahead of the present practice of restry in America. Too far ahead? I do not believe No seed will germinate if the soil is not in suitable ndition. The point is that the rich American forestry il is hard and needs preparing. Experimental work soils work, and soil science is a main foundation of viculture. The ecological and meteorological work ne by the United States forest experiment stations ill be of interest and value to every visiting European rester.

But it is more still that we are looking for in America: he greatest and most instructive textbook for a rester is Nature herself. In the "old country" e have an old forestry. Through a great period of me silvicultural methods tended toward production pure and even-aged stands of the tree species most romising financially. The natural plant associations our forests were changed or killed, the forest soils amaged, and their virgin condition, favorable to a atural reproduction of tree growth, got spoiled. ather late we recognize the damage that has been one. But perhaps not too late. And so we are oking for other parts of the world with comparable onditions of climate and soil where Nature is nearer to er virgin state, in order to learn how she grows orests. Well, but America? With its fire hazard, ts grazing problem, its killing methods of clear-cut ogging? All this is true. But after the logging ature does the seeding, replacing aspen and birch, ines and pencil cedar on old forest land of other pecies. After the fire nature takes care of reforestation, converting a spruce-fir forest into lodgepole pine, or a Norway pine stand into jack pine. And still large areas of virgin forest remain where the local replacement of a Douglas fir generation by western hemlock, of a lodgepole pine generation by Douglas fir, is only the result of nature's work, or where the different hardwood mixture types naturally keep their abundance of species and forms. Should we foresters not look into Nature's power plant as deep as possible before we try to correct her methods? I believe that we can learn from her and that the opportunity to do so is here in America.

After all this talk about what we European foresters can learn here, I suppose you Americans now want to hear what we did learn during our visit to your country. Well, give us a chance to show you that instead of talking about it. Visit us in the old country. Perhaps you will see then that we did learn another thing here (if we had need to learn it)—hospitality among foresters.

Irish Free State Forestry

State forestry in Ireland began in 1905, and in spite of various upsets due to politics and war, has continued to the present. Some 35,000 acres have been acquired, of which 24,000 were bare land needing planting and 4,000 were in timber. Over 13,000 acres have been planted and excellent progress is being made, about 2,500 acres being planted each year. Most attention has been given to conifers, chiefly exotics, which for the most part have done very well. About 27 per cent of the plantings have been Sitka spruce, 23 per cent Scotch pine, 19 per cent Douglas fir, 14 per cent Corsican pine, 9 per cent European larch, and 6 per cent Japanese larch. Douglas fir, Sitka spruce, and lowland white fir have made the most rapid growth, followed by the Japanese larch. On exposed areas, lodgepole pine and the Rocky Mountain form of the Douglas fir have done well. These and the mountain pine (*Pinus montana*) are being planted for windbreaks and shelter belts.

Nursery stock is distributed free to local authorities, and to private forest landowners and farmers. Public institutions and bodies are encouraged to establish nurseries, and for each acre of such nurseries the State contributes £100. Assistance is provisional upon compliance with requirements.

The Irish land act of 1909 provides that the consent of the forestry department shall be obtained prior to cutting on vested holdings. This has resulted in preventing heavy cuttings and in preventing cuttings without reference to the maintenance of the forest.

Rain and the Forest

A study made in South Africa by Dr. John Phillips at the Deepwells Forest Research Station indicates that the Knysna forests of Podocarpus and Olea perform an important function in intercepting and depositing the moisture of fine mist rains. During one season studied, 79 per cent of the rains were of this character. Rain gauges were set out in the forest and on the level ridge of an exposed hill at an elevation of 1,725 feet. The gauge screened by the forest received 94.56 inches of rain, while that in the open received 52.02 inches. Even the "macchia" (chaparral) is responsible for the deposition of an appreciable amount of moisture. In times of light rains less water was caught under the forest canopy than in the open, because of the interception of considerable moisture by the leaves, stems, and branches, and of its subsequent evaporation.

During fine mists the forests are usually dripping wet while the ground immediately beyond their margin is comparatively dry. This same phenomenon has been noted in other parts of South Africa, as in the Transvaal and in Natal, where the evergreen rain forest is coincident with a relatively narrow zone over which heavy mists occur frequently during the dry season. Doctor Phillips believes that his studies strengthen the view that this mist-belt forest is able to stand the long winter drought because of its ability to condense the moisture upon its crowns.

A Study of Forest Fauna and Forest Litter

A study of the fauna of forest litter was carried out by Dr. Stepan Soudek, of the University of Brunn, Czechoslovakia, by taking a sample of soil from a red spruce forest once each month for a year and counting the little animals contained in it. An approximate estimate was made of the number of Collembola and Acarina, which were present in great abundance. Other animals were counted singly. It was found that these creatures do not die in the fall but survive even in the frozen soil. Doctor Soudek's observations led to the conclusion that the entire quantity of organic litter in the forest is transformed in 20 years by passing through the digestive systems of the edaphic fauna.

* * *

The forest service of Java, which was organized 80 years ago, has at Buitenzorg an experiment station for the study of methods of exploitation of the forests, renewal of the teak forests, forest economics, protection against insects and diseases, properties of woods, etc. Java has more than 700,000 hectares of teak forests.

* * *

The membership of the Canadian Forestry Association has grown from 2,000 in 1914 to 29,000 in 1927. The association held 1,604 public meetings in 1927, reaching rural audiences totaling 304,481.

Palestine Sand-Dune Reclamation

Investigations into sand-dune reclamation have b
in progress at the Acre-Haifa Forest Experiment S
tion of the Palestine Government since 1921.
results of this work have now reached a stage at wh
success seems certain—so certain, in fact, that a devel
ment company plans to take over the work for
whole dune area under a long-term lease. The pla
tions of the experiment station so far cover more t
200 acres.

Plank fencing was used in the early work on the
dune but was given up in favor of brushwood, wh
produced more prompt results and proved to be
expensive. Ammophila grass was planted accordin
several methods, that of planting in horizontal r
along the contour giving the best results. Fixa
became marked even during the first season, and
about the end of the third year much of the blow
ceased. The interior dunes, also, were planted to A
mophila, supplemented with Artemesia monopher
a small bush native to the dunes which is propaga
by merely pulling plants to pieces and inserting t
deeply in the sand. The Artemesia soon took root
developed a good cover.

Tests were made of various tree species. Tam
articulata did well on the leeward side of the fore d
but failed on the crest. In general it grew with
appointing slowness, probably owing to local clin
conditions. Eucalyptus rostrata did well on a
where it was not flooded and where the roots c
reach a heavier soil. Other eucalypts did not
such good results. Pinus halepensis gave eviden
finding conditions favorable to success, but the M
terey and maritime pines failed. Of a number of
species commonly found on dunes or on sandy
such as Dalbergia sissoo, Casuarina equiseti
Parkinsonia aculeata, Acacia longifolia, A. melanox
A. mimosa, and A. cyanophylla, the last named di
best. Of more than 18,000 trees of this species pla
in the 1925–26 season, 95 per cent survived. The t
hardy and can be both top and root pruned. At th
of one year the trees were 3 feet high, and in three
they formed a dense thicket with a good leaf mul
the soil. When some plantations 5 years old wer
for wood, the sprouts promptly reclaimed the area
a stand more dense than the original one. I
seeding of this and a number of other species failed.
the Acre nursery little trouble was experience
raising any of the species mentioned except Mon
pine, but the longleaf and Bishop pines failed to su
the first season of strong dry east winds.

* * *

During 1928 there will be felled in Prussian
forests 8,600,000 festmeters of timber, of
2,700,000 festmeters will be hardwoods and 5,9
festmeters will be pine. The figures given out fo
were 2,600,000 festmeters of hardwoods and 5,5
of pine, altogether 8,100,000.

An Arboretum in Wales

The County Council of Denbighshire, Wales, in 07 set aside 50 acres of rough, hilly pasture and orland as the Ceiriog forestry experimental area. ts of 1¼ acres each were laid out and between 07 and 1914 were planted to various species to ermine their fitness for North Wales.

Five species of larch were set out, three plots being en over to the European larch (*L. europaea*). e trees on one plot came from seed collected in otland, those on another from Germany, and those a third from Austria-Hungary. The trees of ottish origin were straighter, taller, and better in ery way than those from the other sources, and parently more free from the larch canker than es from either of the other countries. The Austrian es were poorer than the German. The Japanese ch (*L. leptolepis*) is more vigorous and 7 feet taller an the European, the stands denser, and the trees er from canker. Mixed with Abies grandis, this ch in 19 years attained a height of 32 feet as against e 17 feet reached by the fir. Grown with Douglas , the larch held its own in the stand though some the Douglas firs are now crowding it severely. mixture with Corsican pine resulted in the early ppression and ultimate elimination of the pine, and mixture with Sitka spruce resulted in the overpping and suppression of the spruce, though because its tolerance the spruce still survives. The American stern larch, in pure stands, at first grew faster than e Japanese larch, but was later outstripped in height owth by the oriental tree. The American tree also as very susceptible to the canker. Similarly the rch from western America (*L. occidentalis*) was ferior to the Japanese tree, though better than its astern relative and perhaps slightly less susceptible canker injury. The Siberian larch (*L. siberica*) as of poor form and very slow growth, and was often everely damaged by frost.

Plots were planted to the so-called Fraser River ariety of Douglas fir (*P. t. Caesia*), the Colorado ariety (*P. t. glauca*), and the green variety (*P. t. viridis*). t 17 years the last named has a mean height of 25 eet, the Colorado fir 12 feet, and the Fraser River fir 7 feet. Douglas fir with Sitka spruce appeared to be happy mixture, both growing at about the same rate.

The silver fir (*Abies pectinata*) was severely injured y the insect Dreyfusia Nusslini, and all the trees on ne plot in which the silver fir and the Norway spruce were planted together were entirely killed by it. Of he Abies, the A. grandis grew at the fastest rate, the trees at 16 years being 18 feet tall, while at 19 years the silver fir was but 19 feet in height. Abies nobilis varied greatly in growth, for although at 16 years the average height of the trees in the stand was 12 feet, the tallest was 24 feet and the smallest 3½ feet. A. concolor at the same age had an average height of 11 feet. None of the American firs were attacked by aphids.

The Sitka spruce promises much for planting in pure stands at high elevations in Wales. At 19 years it was 24 feet high as against the 17 feet attained by the Norway spruce. The Serbian spruce (*Picea omorica*) is a slender tree and of slower growth than the Norway. Lawson cypress showed a tendency to multiple stem formation, and though averaging 13 feet at 16 years, is damaged by rabbits. Thuja plicata has grown at the rate of a foot a year and has grown well in mixture except under Douglas fir.

But few hardwoods were planted on the area, because of its elevation. Oak, ash, beech, Norway maple, and sycamore all were tried. The oak, stagnant at first, is picking up slowly, and the ash is not at all vigorous. The beech, which was planted with other hardwoods and with larch, has practically disappeared. Much of it was killed out by rabbits, which also killed the Norway maple.

Bringing Back a Forest in France

On the plateau of Millevaches, Departments of Creuse, Correze, and Haut-Vienne in south central France, 7,952 hectares of denuded forest land have been planted by the owners since 1913. In this work 8,691 kilograms of seed and 14,617,180 young trees were used. The expense to the Government, in subventions of money and cost of free planting stock, was 990,610 francs, or about 124 francs per hectare.

There remains 40,000 hectares of land on the plateau that needs to be planted. "Striking features of the plateau," according to Forest Inspector Miné, of Meymac, "are the small number of villages, their distance apart, their small importance, the small acreage of cultivated land, the poorness of the tree growth, and the enormous surface occupied by swamps and waste land. It has not always been so; farms and forests once occupied most of the land now abandoned. The deserted condition of the country is due solely to the emigration of the population to the big cities, especially Paris and Lyons, the emigration induced undoubtedly by the disappearance of the forest as a result of fire, land clearing, and clear cutting in order to facilitate sheep grazing. This emigration is in full swing now and it seems that there is no way to check it except reestablishing the forest."

Scotch pine is the species most used for planting. Seed are sowed on open sites, usually 4 kilograms to the hectare, in spring or fall, preferably in the rainy period in the spring. For planting 1–1 stock is used. The grass, heather, or other vegetation must be cleared away from the planting spots in advance. Trees are set 1.8 meters apart, or 3,000 to the hectare. After Scotch pine, spruce is most important. Three-year transplants of this species are used, spaced 2.25 meters apart or 2,000 to the hectare. Other species planted are larch, silver fir, maritime pine, white pine, Douglas fir, and Sitka spruce. Planting stock is provided by a Government nursery at Meymac with a capacity of 1,600,000 at a cost of about 22 francs per 1,000.

Personals

Raphael Zon, director of the Lake States Forest Experiment Station, has retired as editor of the Journal of Forestry. Mr. Zon has been connected with American periodical forestry literature ever since its inception in 1902, when the Forestry Quarterly was first published. In 1905 he became editor of the Proceedings of the Society of American Foresters, and he has edited the Journal of Forestry continuously since it was formed by the amalgamation of the Quarterly and the Proceedings. In the editorship of the Journal Mr. Zon is succeeded by Samuel T. Dana, dean of the Michigan School of Forestry and Conservation.

Charles A. Scott has entered upon the duties of extension forester with the Colorado Agricultural College, succeeding Chester A. Lee, who resigned to go into commercial work. Mr. Scott has been engaged in commercial nursery work in Kansas and Florida since 1917, when he completed seven years' service as State forester of Kansas. His earlier work was with the United States Forest Service and with the faculty of the Iowa State College. While in the Federal service he developed the Bessey Forest Nursery at Halsey, Nebr., and did the first large-scale tree planting on the Nebraska sandhills.

J. G. Peters has been appointed chief of the branch of public relations of the United States Forest Service, succeeding R. Y. Stuart, now chief of the service. Mr. Peters's work throughout 25 years' connection with the Forest Service has been in the field of State and private cooperation, and since 1910 he has had charge of the service's activities in cooperation with the States. A. B. Hastings, who has for several years assisted Mr. Peters as chief inspector of cooperative work under the Clarke-McNary law, succeeds him as chief of the division of State cooperation. Mr. Hastings's previous experience, in addition to 5 years as a national forest officer, included 7 years as assistant State forester of Virginia and 3 years as assistant State forester of New Hampshire. Both men are graduates of the Yale Forest School, and Mr. Hastings is president of the Yale Forest School Alumni Association.

Lyle F. Watts, administrative assistant in forest management in the Ogden, Utah, district office of the United States Forest Service, resigned May 1 to become head of the forestry department of the Utah Agricultural College. Mr. Watts is a forestry graduate of the Iowa Agricultural College and has had many years' experience in the Forest Service. His successor is Earl C. Sanford, supervisor of the Caribou National Forest, Idaho, who in turn is succeeded by Frank S. Moore, assistant supervisor of the Payette National Forest, Idaho.

G. H. Collingwood on June 1 becomes forester fo American Forestry Association, succeeding Shirle Allen, now of the faculty of the Michigan Scho Forestry and Conservation. In this position he direct general educational work in forestry, coop with various agencies and with timberland owne promoting forestry interest, and work for rem forestry legislation. Mr. Collingwood received education at the Michigan State Agricultural Co the University of Michigan, and the Universit Munich, Germany. For the past five years h headed the forestry work of the United States E sion Service. His early experience was in work o national forests, and for seven years he taught for at Cornell University.

H. R. Condon, consulting engineer, Century Preserving Co., Pittsburgh, Pa., has been elected dent of the Wood Preservers' Association for the c year. Mr. Condon was formerly forester fo Pennsylvania Railroad.

B. F. Smith, of Elizabeth, La., is the new pre of the Southern Forestry Congress. W. R. State forester of Louisiana, is secretary, and Hardtner, Urania, La., is chairman of the exe committee.

R. M. Nelson, of the Bureau of Plant Industr been permanently stationed at Asheville, N. consulting forest pathologist with the Appal Forest Experiment Station. Mr. Nelson is a gra of the University of Minnesota, and for the pas has been associated with G. F. Gravatt, as pathologist of the Bureau of Plant Industry, in a of chestnut blight.

Stanley P. Young, of Colorado, has been ap head of the division of economic investigations Bureau of Biological Survey, in charge of ac for the control of rodents and predatory a Dr. A. K. Fisher, whom he succeeds, will be a to research in economic ornithology, consisting in studies of the economic status of hawks an

John B. Glenn, of Chipley, Fla., has been ap to the Florida Board of Forestry, filling the v created by the death of E. W. Thorpe, of De Springs. N. J. Wicker succeeds Mr. Thorpe president of the board.

Frank Bonner, engineer of the California N Forest District, and Frederick H. Fowler, who f held that position, are both members of the com appointed by the Governor of California to inv the causes of the collapse of the St. Francis Da ne personnel of the California Forest Research isory Council is as follows: Willis Walker, Red r Lumber Co., San Francisco; D. H. Steinmetz, ering Lumber Co., Standard; C. R. Johnson, Union ber Co., San Francisco; A. Stanwood Murphy, fic Lumber Co., Scotia; Swift Berry, Michigan-ornia Lumber Co., Camino; Edward W. Murphy, rman, State-wide Conservation Committee, Los eles; A. C. Hardison, director, California Develop-t Association, Santa Paula; Isador Zellerbach, rbach Paper Co., San Francisco; Duncan Mc-ie, chairman, State Parks Council, Berkeley; ncis Cuttle, chairman, Tri-Counties Reforestation nmittee, Riverside; Herbert S. Gilman, president, eles Forest Protective Association, San Dimas; H. Fowler, consulting engineer, San Francisco; Lyman Wilbur, president, Leland Stanford Jr. versity; Charles G. Dunwoody, director, conserva- department, California Development Association, Francisco; M. B. Pratt, State forester; Spence D. ner, county forester, Los Angeles County; Prof. ter Mulford, University of California; B. A. Mc-ster, land commissioner, Southern Pacific Railway San Francisco; H. M. Robinson, president, First ional Bank, Los Angeles; E. E. Brownell, director, fornia Woolgrowers Association, San Francisco; W. Campbell, president, University of California, keley.

harles B. Wing, of the engineering department of nford University, has been appointed director of te parks of California.

. Edward Behre has resigned as associate silvi-urist of the Northeastern Forest Experiment tion, with which he has been connected since 1923, ake up farming near Amherst, Mass.

Reuben W. Smith, formerly assistant professor of od preservation at the New York State College of estry and more recently manager of the consulting artment of the Protexol Corporation of New York l Kenilworth, N. J., is now field engineer in the n Francisco office of the National Lumber Manu-turers Association.

Bruce Hoffman has left the United States Forest vice to become assistant to the president of the st Fork Logging Co., Tacoma, Wash. Since join- the service in 1910 Mr. Hoffman has served on ional forests of Alaska and Oregon. Since 1919 he s held the position of chief logging engineer of the trict office of the service at Portland, Oreg.

New officers of the New England section, Society of nerican Foresters, are E. C. Hirst, chairman, and bert C. Cline, secretary. H. I. Baldwin has been cted to the executive committee.

Officers of the Allegheny section, Society of American resters, for the coming year are J. S. Illick, chair-an; K. E. Pfeiffer, vice chairman; and H. F. Round, cretary-treasurer.

Hon. John D. Clarke is president of the New York Forestry Association for 1928. Robert M. Thompson has been made president emeritus, J. R. Simmons secretary-forester, Sherman D. Fuller treasurer, and John D. Clarke chairman of the executive committee.

Howard M. Wight has been appointed special investigator to assist Alvin G. Whitney, professor of zoology in the Michigan School of Forestry and Conservation. His work at Michigan begins with a study of the 200 private wild-life refuges in the State. Professor Wight was for several years instructor and professor of zoology in the Oregon Agricultural College, where he carried on graduate work in that subject. During the past year he attended the Iowa State College as a candidate for the doctor's degree.

J. Nelson Spaeth, of the Forestry Department of the New York State College of Agriculture, will spend May and June in the forests of the Northwest, making a study of white pine blister rust on western white pine for the Bureau of Plant Industry.

Franklin W. Reed, of Washington, D. C., has been appointed industrial forester for the National Lumber Manufacturers' Association. He will undertake a study of forestry projects being carried on by the lumber and pulpwood industry, the results of which will be published in pamphlet form and also prepared for magazine publication. Mr. Reed has been associated for the past four years with Benedict and Rue, forest engineers of Washington. Previously he served for five years as district forester of the Eastern National Forest District.

Roy A. Phillips, inspector of improvement work in the Northern National Forest District, has been assigned as supervisor of the Nezperce National Forest, Idaho.

James E. Ryan, supervisor of the Blackfeet National Forest, Mont., has been transferred to the supervisorship of the Kaniksu National Forest, Wash., from which J. C. Whitham has been furloughed because of ill health. His successor on the Blackfeet Forest is William M. Nagel. Mr. Nagel's successor as supervisor of the Missoula National Forest, Mont., is James F. Brooks, who has been assistant supervisor of the St. Joe National Forest, Idaho.

J. W. Girard, formerly a logging engineer of the United States Forest Service and more recently general manager of the Herrick logging enterprise at Burns, Oreg., has since the closing down of this operation become manager of the Coeur d'Alene Mill Co., with headquarters at Coeur d'Alene, Idaho.

E. P. Meinecke, pathologist of the Bureau of Plant Industry stationed at the San Francisco office of the Forest Service, has sailed for a six-month tour of Europe. Doctor Meinecke will make observations on the larch canker, the European elm disease, and other European tree diseases that are likely to be introduced into this country.

Bibliography

Forest Soils

By E. N. Munns, United States Forest Service

Every forester interested in the relationship of forests and soils, and that should include every technical forester, should read "The Study of Forest Soils," by Dr. Fr. Weis, of the Royal Agricultural College, Denmark. This paper, published in Soil Science for January, 1928, is the summary of the forestry section of the First International Congress of Soil Science held in Washington last June.

Doctor Weis points out that forest soil problems are most acute in temperate or cold humid regions and at high elevations, because in these localities only "are we dealing with one of the most fundamental phenomena in forest soils, i. e., the formation and accumulation of raw humus." He points out that if the forest soil is to be maintained in a healthy condition it is important that this raw humus be so treated that decomposition is hastened.

On six points the soil scientist can advise the forester in his general problem of maintaining healthy forest conditions and of obtaining the maximum tree growth. These are the effect of fires, of forest management, and of excess water upon the soil properties; the relation of forests to ground water; the use of soil surveys for mapping types and sites; and the use of a simple soil factor to evaluate forest sites.

Doctor Weis indicates striking differences between the study of agricultural soil and that of forest soil. How exactly his classification applies to the soils of this country is open to question; but since only a very limited amount of work has been done in America upon forest soils, the classification can be accepted for the time being.

American foresters have too long concentrated their attention on the outward evidences of growth—diameter, height, volume—and neglected to study the soil. It should be remembered that of all the various factors entering into site, the soil is the only one which man can modify or change through management. The weather elements are beyond our control, we must accept the topography and geology as nature gives them to us, we can not change a forest's history; but we can modify soil conditions. Each time we thin or harvest a stand, graze or burn over an area, one way or another a change is set up in the soil. The basic facts of the anatomy, physiology, and biology of the soil are revealed by the soil of the virgin forest. Only through the use of virgin forest soils as a standard can we know what changes our system of management, our forest practices, our handling of the cover will effect in the soil. (For the most part one is inclined to believe that present practices are affecting fore soils for the worse.) Most of our old-growth forest on which grazing is possible has already been put to that use. By far the greater part has already been cut over, and much of that remaining has been obligated or is being obligated for cutting. It is by no means too early to be setting virgin forest areas aside to be retained in a natural state.

Forest Thoroughbreds

By W. N. Sparhawk, United States Forest Service

Only within the last two or three decades have the careful selection of seed and the breeding of especially adapted varieties of crop plants come into practice as important factors in increasing the quantity and quality of agricultural yields. Although a few "super technical" foresters have suggested that similar measures might be worth trying in silviculture, most foresters have been inclined to scout the suggestio on the ground that tree generations are too long To such, Walter Seitz's recent book (Edelrassen de Waldes, Berlin, 1927) should give food for thought.

Seitz points out that the desirable races of trees do not have to be created through breeding, as di most of the finer varieties of agricultural plants, bu already exist and can be identified at all stages growth. He asserts that the many "source-of-seed experiments that have been undertaken in Europ (his statement would apply in the same way to thos undertaken in the United States), as well as the presen German plan of certifying forest tree seed, have starte with an erroneous assumption, viz., that racial differ ences in tree species are climatic or regional, so tha all seed from a given locality belong to one race. O the contrary, he says, plants from one lot of seed ma differ just as widely as plants from different lots One stand may be composed of trees of several distinc races. Not only may the individuals in a given stan differ greatly in form, appearance of bark and foliag and growth habits in general, but it has been observe for instance, that certain individual trees in a stan are consistently avoided by caterpillars, year afte year, and that certain individuals escape damag when their neighbors are damaged by frost or fungou diseases. It is necessary, then, to select seed tre on the basis of the individual trees, not the localit in which they grow.

Seitz discusses the oaks Q. pedunculata and (sessiliflora and their hybrids, especially two whic ave acquired stable heritable characteristics (designated as Q. aequalis and Q. cerrifolia), and Scotch ine, of which he selects two varieties believed to be ure strains of the original pine, native to Germany nce the last ice age. The other and more common ines are believed to be descendants of races that rept in from the south after the glacial period. They re likely to be inferior to the native races in form and resistance to various natural enemies, and their ood is decidedly inferior in quality. The original ces have been able to maintain themselves in a comaratively pure form, in spite of the susceptibility of ine to crosspollination, owing to the fact that they sually flower later than the races of southern origin.

It is pointed out that almost any lot of commercial eed (either pine or oak) contains seed of several races, nd that the small seed as likely as not come from the nore desirable parents. It is desirable, therefore, efore sowing, to grade the seed by size and to sow he small seed by itself. If this is not done, it is rgued, more vigorous seedlings from large seed of nferior parents may crowd out smaller but ultimately etter plants. It is stated that seed production of elected trees can be stimulated by loosening the soil eneath them and covering it with a mulch consisting n a thick layer of grass, straw, or fine litter.

As might be expected of a German forester, Seitz ecognizes wild game as an important forest product, nd is keenly interested in developing thoroughbred eer as well as trees. He concludes with a chapter on he possibility of accomplishing this through selective hooting.

The book is profusely illustrated with excellent lates which show some fine examples of large old nes and oaks.

Forest Fires in Minnesota

An important step in solving the problem of forest ires in Minnesota, which burn over about 400,000 cres yearly, is an analysis of the reasons for the 1,000 o 1,300 fires that, on the average, run through the imber each year and for the losses, averaging over a nillion dollars a year, which they entail. Such an nalysis is given in a bulletin just issued by the Minnesota Forest Service, entitled "Forest Fires in Minnesota." The study was made by J. A. Mitchell, of the Lake States Forest Experiment Station, in cooperation with the State forestry officials.

During the past 10 years, according to the bulletin, the average number of forest fires has increased 100 per cent, largely as a result of land-clearing activities and of increases in the area of cut-over land and in the number of people who visit the forested region or sport and recreation. Land clearing was responsible for 27 per cent of the fires in the 10 years 1916 to 1925 inclusive, railroads for 21.7 per cent, campers and smokers for 21.1 per cent, and miscellaneous causes for the rest. Efforts of State and local forest officers and private owners have decreased the size of the average fire 64 per cent and the average burned area 25 per cent in spite of the greater number of fires. Large fires are responsible for the bulk of the losses. During the 10 years covered by the study 7 per cent of the fires were over 1,000 acres in size and these fires were responsible for 71 per cent of the area burned, 63 per cent of the total damage, and 47 per cent of the suppression costs. All of the great conflagrations have been the result of prolonged drought, high winds, and numerous uncontrolled small fires. All of Minnesota's great forest fires have occurred in late September or early October.

Approximately 23,500,000 acres of forest land in the State are in need of organized protection. It is estimated that the merchantable timber on this land is worth about $105,000,000 and that the annual growth of pulpwood and saw timber is worth $2,750,000.

The conclusion reached from the study and analysis of the situation is that the permanent protective force needs to be double what it is now, and that additional lookout towers and fire-fighting equipment, a trained emergency force, and additional funds are required. The cost of adequate protection is estimated at $650,000 annually, of which $100,000 would constitute an emergency fund for abnormally bad seasons.

Inquiries in regard to the bulletin may be addressed to the Lake States Forest Experiment Station, St. Paul, Minn., or to the Commissioner of Forestry and Fire Prevention of Minnesota

Scaling Manual

By J. A. [illegible], United States Forest Service

A revised edition of the Forest Service timber-scaling manual has just been made available. In form and presentation it very closely follows previous issues. The principal change consists in the addition of instructions and diagrams describing the methods used in making deductions for the common forms of defect. Owing to the difference in the action of any given fungus in different species and under different soil and climatic conditions no attempt has been made to include instructions covering deductions for defects originating from fungi other than those which take the form of center or circular rots. Other changes consist in acknowledging knots under certain conditions as a defect, permitting 40-foot logs to be scaled as single logs in the national forests of Alaska and west of the summit of the Cascade Mountains in Washington and Oregon, and permitting 17-foot logs cut for 8½-foot ties to be scaled as single logs. The tables and sample forms in the appendix have been revised.

Copies of this manual (Instructions for the Scaling and Measurement of National Forest Timber) can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 35 cents a copy.

Recommending a Book on Forest Botany

By E. N. Munns, United States Forest Service

To one who comes in contact with the written product of many foresters, it appears that foresters are woefully lacking in botanical training. Some of this deficiency is traceable to inadequate high-school training, some is due to a slighting of botany in the college course, Every forester should have a working knowledge of botany, and one method by which the interest of the undergraduate could be aroused in such subjects as plant physiology and ecology would seem to be through a short course in botany using the tree as the example, following some such book as Somerville's How a Tree Grows.

This little book is the outgrowth of a series of lectures given to Oxford students. With its numerous illustrations and carefully and clearly written text, it gives much of that background so badly needed by the practicing forester. The author follows the title of his book very closely all the way through except as he leaves the discussion of wood structure to take up questions of wood identification. Although English species are used as examples for the most part, that fact does not obtrude as in some other British forestry literature.

The book is well worth the while of the older forester as a means of refreshing one's knowledge of elementary botany if for no other reason.

(William Somerville: How a Tree Grows. pp. 205, il. 112. Oxford University Press. Humphrey Milford, London, 1927.)

Timber Growing and Logging Practice in the Lake States

Raphael Zon's contribution to the series of bulletins on timber growing and logging practice in the various forest regions of the United States is a singularly clear and practical presentation of the steps necessary to prevent timberland in the Lake States from becoming barren and those additional steps necessary to establish desirable forestry practice on the land. The author has gone so far as to summarize these steps in parallel columns at the end of the bulletin. This summary is truly multum in parvo and is a striking evidence of the sureness and understanding with which the whole subject is handled.

To prevent timberland from becoming barren the principal steps to be recommended are (1) fireproofing the woods, as far as possible, by slash burning or other ways of reducing the fire danger from slash or debris left after cutting, and (2) keeping fire out of the woods thereafter by a protective organization.

For desirable forestry practice Zon recommends cutting under the "selective" system, by which young reproduction is safeguarded, and control of the most valuable species by favoring these and cutting out the less valuable ones. Release cuttings, thinnings, and underplantings also are advocated and where advisable, plantings to stock barren lands. Good forest management also may involve certain protective measures against diseases and insects.

Prescribing what he terms "first aid to reforestation," Zon declares that fire prevention is the key to the situation. Slash disposal is an effective means of reducing the fire hazard. Other "first aids" are good logging practice—cutting to a certain diameter limit and saving young and unmerchantable trees—and stabilization of forest taxation, in which the Lake States already are making considerable progress.

The bulletin contains detailed discussions of the measures best suited for the various types of forest in the Lake States, clarified and made interesting by many concrete illustrations.

The title of the bulletin is "Timber Growing and Logging Practice in the Lake States." Copies may be obtained, while the supply lasts, by writing to the United States Department of Agriculture, Washington, D. C.

Three New Tree Books

Tree lovers of Louisiana are indebted to Caroline Dormon, of the forestry division of the Louisiana Department of Conservation, for a recent publication of the department entitled "Forest Trees of Louisiana and How to Know Them." Descriptions of 100 species appear in this booklet, written in a pleasantly informal way by one who has had many years' experience in making Louisiana people acquainted with Louisia trees.

A new tree guide has been published by the New York State College of Agriculture, Cornell University, as the joint work of J. A. Cope and Gardiner Bump. "Fifty Common Trees of New York" has been prepared specifically to meet the needs of Four-H clubs in their "forest appreciation" studies. The descriptions of tree species are prefaced by directions for using the bulletin and for making the tree collection which, with training in tree identification and instruction in tree uses, is included in the second-year work of Four-H clubs studying forestry.

A pocket manual entitled "Forest Trees of Oklahoma" has made its appearance as the fourteenth in the series of tree guides prepared for as many States through cooperation of State forestry officials and W. R. Mattoon, of the United States Forest Service. Altogether, 74 species are described. The trees that are described here for the first time in the tree-guide series are the nut pine or pinon, shin oak, and mesquite.

All three of these booklets are illustrated from origina drawings by Mrs. A. E. Hoyle, United States Forest Service.

Windbreaks and Shelter Belts for Maryland

By J. H. Buell, United States Forest Service

A 39-page pamphlet by Fred B. Trenk on "Windbreaks and Shelter Belts for Maryland," published by the Maryland State Department of Forestry, as described in the introduction by F. W. Besley "sets forth in an orderly way complete information regarding windbreaks, the purpose they serve, how they may be established and maintained, and the benefits to be derived from them."

A short review of the causes and behavior of winds is followed by a discussion of the protection afforded to farmsteads and crops by windbreaks and shelter belts. They break the mechanical force of the wind, reduce evaporation, and intensify and modify temperatures on their leeward sides. Mr. Trenk tells how a windbreak's efficiency is affected by its orientation, the surrounding topography, and the height of the trees and the density of their crowns. He considers also the disadvantages of windbreaks—the shading of adjoining lands, the sapping of moisture and plant food from these lands, and the possibility of causing frost pockets.

Characteristics of trees desirable and undesirable for windbreaks and shelter belts are discussed and set forth in tabular form. Instructions for establishing and maintaining effective windbreaks and shelter belts are given and approximate costs of establishment per 100 linear yards are presented in tables.

Much of the information contained in the bulletin is widely applicable and does not by any means relate exclusively to Maryland or even to the Middle Atlantic States.

Danish Experimental Forestry Service

The Danish Experimental Commission has issued a small volume, entitled "Danish Experimental Forestry Service, Account of the Agency, 1901–1926" which gives a short résumé of the development of experimental forestry in Denmark from 1793 to 1926, and of the work now being done. It contains also a list of the publications issued from 1905 to 1926 and of the personnel from 1901 to 1926. Brief mention is made of outstanding leaders like C. D. F. Reventlow, who did the first work on tree growth and test of exotic species, and C. V. Opperman, who initiated sample plot control and whose work was later carried on and expanded by Ch. Lütken.

Present research in Denmark deals primarily with growth and yield of native species under different methods of treatment; growth of introduced species such as Douglas fir and Sitka spruce; soils investigations, particularly in the heath type; investigations of tree races and genetics; and the use of timber and timber products.

Sixty-five excellent photographs are included.

Forest Tree Nursery Suggestions for North Dakota Farms

Directions for establishing and operating forest tree nurseries on North Dakota farms are given in Extension Circular No. 3, The Farm Nursery for Forest Trees, by State Extension Forester Charles A. Gillett. Each member of the junior forestry clubs of the North Dakota Extension Service is required to raise by himself enough trees for one adequate shelter belt, and this circular is being placed in the hands of all members as a working manual. It deals systematically with the subject from source of seed through the seed-bed and transplanting process to the time when the stock is ready for planting. The aim of the circular is to educate the rural boys and girls of North Dakota along constructive forestry lines and to encourage the establishment of new windbreaks in that State.

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Two papers by Donald Bruce that appeared in the Journal of Agricultural Research, "A Method of Preparing Timber-Yield Tables" and "Some Possible Errors in the Use of Curves," are now available for distribution as reprints. Requests should be addressed to the Forest Service, Washington, D. C.

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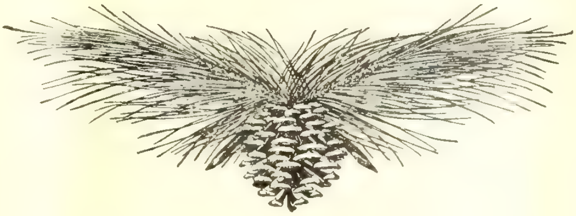
FOREST WORKER



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Announcements

Eddy Station Wants Seeds of 10 American Pines

The 33 species and varieties of the genus Pinus of which the Eddy Tree Breeding Station has not yet obtained seed for its nursery and plantation tests, after two years' work during which it has obtained seed of 87 species and important varieties from all parts of the world, include 10 native American species occurring within the borders of the United States. In the hope that readers of the Forest Worker may be able to supply small amounts of seed of some or all of these pines, the species and their ranges are here listed as given by the station:

P. apacheca (Apache pine)—Arizona and New Mexico.

P. arizonica, or *P. ponderosa* var. *arizonica* (Arizona pine)—Arizona and New Mexico.

P. balfouriana (foxtail pine)—California.

P. cembroides (Mexican stone pine)—Arizona, New Mexico, and Texas.

P. clausa (sand pine)—Florida to Alabama.

P. cubensis (not *P. caribaea*, but a southern form)—southern Florida.

P. glabra (Spruce pine)—South Carolina to Florida and Louisiana.

P. parryana (Parry pine)—Southern California.

P. ponderosa mayriana (Mayr pine)—Arizona.

P. tropicalis—Florida.

To contributors of seed of these species the Eddy Tree Breeding Station will gladly send in return seed of various California trees including *Sequoia sempervirens* (redwood) and *Sequoia washingtoniana* (giant sequoia). Communications in regard to the matter should be addressed to Lloyd Austin, Director, Eddy Tree Breeding Station, Placerville, Calif.

Editor's note.—In the Check List of Forest Trees of the United States, by George B. Sudworth, *P. mayriana* (Mayr pine) is given as identical with *P. apacheca*, the common names of *P. cembroides* and *P. parryana* are given as Mexican piñon and Parry piñon, respectively, and *P. cubensis* is given as a former designation of *P. caribaea*. *P. cubensis* is recognized by some botanists as a variety of *P. caribaea*. *P. tropicalis* is not given in the Check List.

Forestry Research Fellowships at University of Idaho

Two research fellowships are offered by the School of Forestry, University of Idaho, for the academic year beginning September 1, 1928. A bachelor's degree in forestry is required. The students will be expected [illegible] give most of their time to research in the decay resi[illegible]ance of wood or in wood utilization. They will be given opportunity to complete in one year the requirements for the master's degree. The fellowships do not involve any instructional duties. Each carries an annual stipend of $900. Anyone interested in applying for one of these fellowships should write to Dr. E. E. Hubert, Forest Research Laboratory, School of Forestry, Moscow, Idaho, giving his age, his degree and year of graduation, the name of the institution from which he was graduated, a list of the studies he has completed that fit him for research work of the sort proposed (including cultural studies and laboratory work), an account of his field and laboratory experience, and a small photograph of himself.

Because the free edition of this periodical is necessarily limited, it can be distributed without charge outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

Material offered for publication in the Forest Worker should be addressed to the Editor, United States Forest Service, Washington, D. C.

FOREST WORKER

Washington, D. C. JULY, 1928 Vol. 4, No. 4

State Forestry

Franconia Notch Now in Public Ownership

On June 7 arrangements were completed for making Franconia Notch, in New Hampshire, the property of the State and the Society for Protection of New Hampshire Forests. Fifteen thousand contributors joined in giving the $200,000 which the society raised as its half of the purchase price. The property thus brought into public ownership includes the Old Man of the Mountain, Echo and Profile Lakes, the Flume, and about 6,000 acres of land in the towns of Franconia and Lincoln. The former owners are to have the income from the Flume for 1928 and 1929. A deed to about 1,000 acres including the Flume and its surroundings has been received by the society, which agrees to turn it over to the State within 20 years. Condemnation proceedings will be brought by the State to perfect title to the unoccupied wild lands. The society is prepared to advance funds this season for urgent improvement work such as clearing away slash and restoring important trails.

Farmers Lead in New York Tree Planting

If the different "classes" of tree planters in New York were actually competing with each other in increasing their plantings from season to season, the prize for this spring would go to the farmers and other individual landowners. This class planted 10,345,565 trees, or 772,740 more than in the spring of 1927. The largest proportionate increase was scored by the school districts, which in planting 187,000 trees outdid their last spring's record by more than 250 per cent. The 3,161,450 trees from the State nurseries that found their way into municipal plantations were 487,450 more than did so last spring, and the 1,045,800 ordered by sportsmen's clubs and other organizations exceeded last spring's orders from this class by 389,900.

Industrial concerns planted 1,556,900; schools, 165,400 (outside of regular school district forests); Boy Scouts, 120,400; and the State, 3,089,000. The total spring planting was about 19,500,000. It is expected that fall plantings will call for about 6,000,000 trees.

Heavy Fines and Imprisonment for Forest Incendiaries

A sentence of $200 fine and 90 days' imprisonment was imposed on each of four men in April, 1928, for maliciously setting fires on virgin timberlands and protected cut-over areas near Bogalusa, La. Judge P. B. Carter, of the twenty-sixth judicial district, Louisiana, pronounced the sentences, which are thought to be the heaviest ever given for woods burning in Louisiana. In the not far distant past it was difficult to get fines of more than $25 imposed upon men convicted of burning areas of even a square mile or more.

Two of the men were convicted of setting fire on March 21 to an area of excellent pine reproduction in a 15,000-acre fenced pasture that had not been burned since 1921. The tract is cut into quarter sections by burned firebreaks about 100 feet wide. A State lookout in a tower 3½ miles away spotted the fire so promptly that the incendiaries were caught as they left the area. With a high north wind, however, and in extremely dry grass and young pine, the fire became so hot that it ran across several recently burned firebreaks and kept 40 fire fighters busy till 10 o'clock p. m. The burn covered 800 acres, part of it in the Memorial Pasture dedicated to Bogalusa's war dead. Damage was done to 650 acres of longleaf seedlings 6 and 7 years old running many thousand to the acre, and a magnificent stand of loblolly seedlings of the same age covering 150 acres was completely wiped out.

The second pair convicted were a father and son who had set fires in virgin timber belonging to a large lumber company.

Planting Stock Distributed by Ohio

About 3,000,000 trees were distributed for planting this spring by the Ohio Agricultural Experiment Station, Wooster. Some 1,390,000 of these went to farmers. The park boards of Cleveland, Akron, Cincinnati, and Massillon took 385,500, and the waterworks of Akron, Barberton, and Wellston 235,000. Manufacturing firms, chiefly manufacturers of brick and other clay products, were supplied with 239,600, and 325,600 were used in plantings on State forests.

Trains and Transients Cause Most Fires in Pennsylvania

More than 30 per cent of the forest fires recorded by the State forestry organization of Pennsylvania in the last five years, Chief Forest Fire Warden Wirt finds, have been charged to "transients"—people who go to the woods for recreation or for such purposes as berry picking. Almost the same proportion has been attributed to railroads. In Pennsylvania more than 4,000 miles of railroad tracks are bordered by forest lands and, in addition, many miles of track are bordered by abandoned or unprotected fields that adjoin forest areas. In several of the State's forest districts half or more of the fires handled by the protection forces in a single season have been traced to railroad operations, and records for 1921 placed on railroads the responsibility for 41 per cent of the year's fires.

In the 15 years since Pennsylvania began to keep records of the causes of forest fires about 7 per cent of the fires recorded in the average year have been charged to brush burning. The proportion classed as incendiary has usually been below that figure. Fires traced to lumbering operations have in no year of this period been more than 3½ per cent, and for the last six years have been less than 2 per cent of the total. Except in 1925, when 62 lightning fires constituted almost 2½ per cent of the fires reported, lightning has seldom accounted for more than one-half of 1 per cent of a year's total.

In recent years not more than 13 or 14 per cent of the fires that have gone into the Pennsylvania records have taken their place under the heading "Cause unknown."

The Locomotive Spark Cools Off in Connecticut

Fires traced to railroads made up 26 per cent of the forest fires recorded in Connecticut in 1924. The proportion sank to 22 per cent in 1925 and to 16.7 per cent in 1926, and in 1927 it was only 13 per cent. This decrease in railroad-caused fires is attributed by the State department of forestry partly to the removal of trains in some sparsely settled regions and to substitution of gasoline and electric power for steam, but also in part to the improvement of locomotives and cleaning up of rights of way.

* * *

Headquarters for the Federal inspection of cooperative work in fire protection and the distribution of forest planting stock under the Clarke-McNary law in the Central States have been established by District Forest Inspector E. Murray Bruner in the Federal Building, Louisville, Ky. The Central States district includes Illinois, Indiana, Iowa, Kentucky, Missouri, Ohio, and Tennessee.

Maryland Forestry Department Work in 1927

In reporting on its work during the year ending September 30, 1927, the Maryland Department o Forestry emphasizes its efforts to assist private owner of woodlands. In 55 cases a forester of the Stat organization, upon the owner's request, examined woodland in company with the owner or his agent, discussed its condition and desirable plans of management on the ground, and later gave the owner a written report with recommendations. The 55 examination covered 18,726 acres of woodland in 21 differen counties. In 10 cases in which examination showed an amount of mature timber sufficient to justify a logging operation, the department of forestry furnished a forester to go over the tract, with two assistant furnished by the owner, marking and measuring the trees that should be cut. (The cost of this work is borne approximately one-half by the owner and one-half by the forestry department.) These marking covered 465 acres in 7 different counties. In addition one estimate of the amount of timber to be cut was made, covering 1,318 acres of woodland, and three areas were marked for thinning. In 16 cases in which owners were seeking information as to the proper use of waste lands the department examined the lands to determine whether they were suitable for forest planting, and if so what species of trees and what planting methods should be used.

The State forest nursery during the year distributed at cost for forest planting 310,620 trees of 18 different species, of which loblolly pine, white pine, red pine Norway spruce, and tulip poplar were the most largely used. For roadside planting it distributed at cost 7[illegible] trees, principally elm, ash, oriental plane, tulip poplar red gum, and cypress.

The forest warden force of the State was increased during the year by about 50 and the number of cooperating volunteer fire companies by 13. Three large emergency fire crews were organized during the year from employees of the Kelly-Springfield Tire Co., in Cumberland, employees of the Ox-Fibre Brush Co., at Frederick, and the Izaak Walton League of Frederick.

Investigations reported as under progress during the year included preliminary studies of the buried cypress trees of Pocomoke Swamp. For 75 years or more Marylanders have been digging from portions of this swamp cypress timbers sunk there ages ago. Studies are planned to determine the amount of the buried cypress timber and practicable methods for its utilization.

* * *

About 60,000 acres of land in Wisconsin has been classified for taxation purposes under the provisions of the forest crop law, through action taken by the conservation commission on June 8.

Reforestation Investigative Committee for New York

An act of the New York Legislature approved March creates a temporary State commission "to investigate generally the subject of reforestation, with particular reference to ascertaining the location, value and area of [illegible]nds in the State unsuitable for agriculture but which might be utilized for reforestation, and the best means of promoting and financing reforestation within the State." The membership provided for consists of four senators appointed by the temporary president of the senate, four members of the assembly appointed by the speaker of the assembly, three members appointed by the governor, the speaker of the assembly ex officio, the president pro tempore of the senate ex officio, and two members ex officio named by the commission. The commission is authorized to sit anywhere within or without the State, to take testimony, subpœna witnesses, and require the production of books, records, and papers, and otherwise is given all the powers of a legislative committee. The sum of $50,000 is made available for payment of its expenses. The act directs the commission to report to the legislature on or before March 1, 1929, and to submit with its report such proposed legislative bills as it may consider necessary to carry its recommendations into effect.

Appointments to the commission are as follows: Members at large, Robert W. Higbie, Kew Gardens; George F. Warren, Ithaca; and Nelson C. Brown, Syracuse; State senators, Charles J. Hewitt, Locke; Warren T. Thayer, Chateaugay; Leon F. Wheatley, Cornell; and John A. Hastings, New York City; State [illegible]blymen, Eberly Hutchinson, Green Lake; Ellis W. Bentley, Windham; Clarence L. Fisher, Lyons Falls; and Joseph E. Kinsley, New York City. The responsibility of drawing up a program for the commission's activities has been given to a committee composed of Senator Hewitt, Assemblyman Hutchinson, and Professor Brown.

Increases in Extra Clarke-McNary Allotments

In the fiscal year 1929 each State cooperating in forest fire protection under the Clarke-McNary law will receive from the Federal Government 8.5 per cent of the estimated cost of adequate protection for its State and private forest lands. This is the same percentage on which the regular allotments of the preceding year were figured. Substantial increases appear, however, in the extra allotments made to States in which State and private expenditures for fire prevention alone are greater than the regular Federal allotments. For fire protection work to be carried on under the Clarke-McNary law in the fiscal year 1929 Congress appropriated $1,200,000, instead of the even $1,000,000 it provided the preceding year. Subtracting from this amount the regular allotments to the cooperating States, the $80,000 required for administration, and $60,000 for the forest taxation inquiry leaves $250,000 for extra allotments. Thus in 1929 for the first time the appropriation will be divided almost in accordance with the original program of the Department of Agriculture, by which 25 per cent of the whole would be distributed as extra allotments.

Extra allotments for the fiscal year 1929 are based on the amounts the States expended for forest fire prevention in the calendar year 1928. Previously extra allotments have been determined on the basis of estimated expenditures by the States in the fiscal year covered by the allotments. This change will greatly simplify the handling of reimbursements. Hereafter reimbursements for fire-prevention expenditures will be made currently on a 50-50 basis until the State has received the whole of its extra allotment. Under this arrangement, also, it will be possible to announce the amounts of extra allotments as soon after the beginning of each calendar year as the Federal appropriation is made.

The Federal allotments to the 38 cooperating States are as follows:

State	Regular allotments, 8.5 per cent of estimated cost of adequate protection	Extra allotments	Total allotments
Maine	$38, 250	$11, 200	$49, 450
New Hampshire	11, 416	3, 330	14, 746
Vermont	6, 698	750	7, 448
Massachusetts	14, 510	7, 700	22, 210
Rhode Island	1, 224	150	1, 374
Connecticut	5, 100	2, 520	7, 620
New York	33, 022	21, 120	54, 142
New Jersey	7, 004	9, 560	16, 564
Pennsylvania	33, 448	9, 850	43, 298
Delaware	765		765
Maryland	5, 610	1, 600	7, 210
Ohio	2, 363	1, 540	3, 903
Indiana	1, 700		1, 700
Illinois	850		850
Virginia	30, 991		30, 991
West Virginia	16, 362	4, 400	20, 762
North Carolina	41, 438		41, 438
South Carolina	11, 810		11, 810
Kentucky	14, 600		14, 600
Tennessee	21, 250	10	21, 260
Georgia	38, 250	130	38, 380
Florida	25, 000		25, 000
Alabama	38, 250	4, 820	43, 070
Mississippi	32, 555	860	33, 415
Louisiana	29, 087	10, 850	39, 937
Texas	30, 532	190	30, 722
Oklahoma	13, 600	2, 030	15, 630
Missouri	8, 000		8, 000
Michigan	42, 594	32, 000	74, 594
Wisconsin	27, 276	5, 360	32, 636
Minnesota	55, 743	15, 880	71, 623
South Dakota	128	247	375
Montana	16, 618	3, 310	19, 928
Idaho:			
North	29, 750	16, 813	46, 563
South	2, 958	1, 150	4, 108
Washington	36, 125	33, 030	69, 155
Oregon	34, 892	30, 120	65, 012
California	34, 425	19, 170	53, 595
New Mexico	1, 606	310	1, 916
Total	795, 800	250, 000	1, 045, 800

New York Conservation Law Liberalized

The conservation law of New York State was so revised at the recent legislative session that the State conservation commission is now empowered to establish State parks and parkways in counties where it was formerly restrained from doing so, and to enter into cooperative agreement with municipalities or persons for the purpose of protecting forests of the State from fire and promoting the practice of forestry. As revised the law also permits municipalities, school districts, and other political subdivisions of the State to acquire lands anywhere in the State for forestry purposes. Formerly, municipal and other community forests could be established only within the boundaries of the political unit establishing them.

Inventory of Alabama State Lands

An inventory of lands owned by the State of Alabama is being made by the Alabama State Commission of Forestry, as directed by the legislature at its last session. Of the 2,258,222 acres of land granted to the State by the Federal Government for various purposes, much has been diverted from the purposes for which it was granted and the legal ownership of much has become a matter of doubt. The commission is making progress in protecting State lands against trespass and larceny, settling title questions in doubtful cases, classifying and appraising particular tracts, and seeing that full value is received by the State in cases of sale of either land or timber.

❧

An appropriation of $20,000 a year has been made by the Mississippi Legislature for the calendar years 1928 and 1929. This is twice the amount the legislature appropriated in 1926 for the first two years of State forestry work in Mississippi.

❧

The income from Pennsylvania's 1,133,050 acres of State forests in 1927 was $96,090. Purchased within the last 30 years at an average price of $2.26 an acre, these forests are now worth about $12.50 an acre, according to estimates quoted by the Pennsylvania Forestry Association.

❧

Two 90-foot steel lookout towers have been completed this season by the Texas Forest Service in cooperation with the Southern Pine Lumber Co. and the Houston County Timber Co. They are located at Ratcliff, in eastern Houston County, and on Bird Mountain, in southeastern Anderson County. Each is surmounted by a glass-inclosed cabin 8½ feet square.

Locust Plantation Proves Farm Family’ Stand-by

On the farm of John M. Ham, in Dutchess County N. Y., a 6-acre plantation of locusts was made in 184 by three brothers, Lewis, Milton, and Jonathan Ham with seedlings they had raised in their own farm fores nursery. In the early nineties, some 50 years lat New York contractor bought some of the trees fo cribbing purposes, paying $1,500. When a new farm house and barn were built the sills came from th locust grove, and from this grove also has come th fencing material used on the farm over a period o about 70 years. To-day the original locust grove i somewhat depleted; but the nursery is now a full fledged forest, and a field about 100 yards from the ol plantation that has not been plowed since 1881 is producing a fine growth of self-seeded locust.

Three Osage Orange Trees for 80 Rod of Farm Fence

Fence posts worth $45 were cut last summer fror three Osage orange trees which Oliver P. La Fuze, c Liberty, Ind., had allowed to grow for 30 years in waste corner of a field. The posts were sufficient t build 80 rods of fence, including 4 corner posts, wit 15 ordinary posts and 5 corner posts left over. Thei value was estimated at $2 each for corner posts an 30 cents each for others. Since the three trees ha occupied about 1,600 square feet, their yield was a the rate of $1,223 an acre, or about $40 per acre year.

In relating this instance R. F. Wilcox, acting Stat forester of Indiana, suggests that since borer an blight have made the locust and the chestnut unce tain crops in Indiana, tree planters of the State migh well interest themselves in the possibilities of th Osage orange.

❧

Two State forests were established in Alabama o April 17, 1928. Both are located in Clarke Count Their areas are 1,280 acres and 1,920 acres.

❧

County forestry work in Alabama is to have i beginning in Dallas County, where the commissione have voted to spend $300 on such work in cooperatio with the State and Federal Governments.

❧

Virginia's first 80-foot steel lookout tower has bee erected near Shady Grove Church, Spotsylvan County, through cooperation of the Virginia Fore Service and the Spotsylvania Forest Fire Protecti Association.

New State Nursery near Raleigh, N. C.

North Carolina has a new State nursery site in Wake County, about 10 miles southeast of Raleigh. It includes 9.28 acres of land having a frontage of more than 600 feet on Highway No. 10, the main east and west highway of the State. An adequate er system has been established, a house consisting a packing shed and storage room has been built, and longleaf pine seed have been sown in about 600 feet of beds 4 feet wide. An output of about 350,000 trees is expected this fall, about 50 per cent longleaf.

Oregon Ranchers Plant Trees

Four hundred Oregon ranchers this spring planted 38,000 trees that had been raised in the State forest nursery. The trees were principally black locust, green ash, Russian mulberry, Russian olive, and box elder, and were used largely on irrigation projects in the southern and eastern parts of the State. The nursery is being developed out of stump land located near the forest school of the Oregon State College, at Corvallis, under the supervision of George W. Peavy, dean of the school and member of the State board of forestry. Next spring it is expected to have at least 250,000 trees ready for distribution, including some Douglas fir.

Maryland Police Protect Dogwood

Maryland dogwood this year enjoyed the protection he State police force, each member of which has been sworn in as a deputy forest warden and has received orders to enforce rigidly the State law prohibiting the gathering of wild flowers along roadsides. This statute makes it unlawful "for any person to remove, take, cut, break, injure, or destroy any tree, shrub, vine, flower, moss, or turf," and carries a penalty of from $5 to $25.

A Fire-fighting Train Crew

A report of Ranger C. E. Dare, of the New York State forestry organization, recalls a story printed in the November, 1927, FOREST WORKER about the stopping of a train in the Landes district of France in order that crew and passengers might fight a forest fire. On December 15, 1927, a passenger train on the Long Island Railroad was stopped at Great River, Long Island, in Ranger Dare's district, while the crew extinguished a fire in a thicket alongside the tracks. The passengers not only tolerated a 21-minute delay but complimented the conductor and crew on their vigilance, as did the officials of the railroad.

Good Longleaf Seed Year in South Georgia

Longleaf pine seed will be abundant in many parts of south Georgia this fall, according to indications reported by members of the Georgia Forest Service. The service is sending out word to Georgia landowners that this will mean an opportunity for obtaining natural reproduction of the longleaf pine such as occurs only once in from 4 to 7 years. It warns them also that in its early years, and especially during the first year, longleaf pine can be killed by almost any sort of fire. On lands where natural reforestation with this species is desired the service urges landowners to have firebreaks prepared before winter.

A fairly good crop of longleaf pine seed in the central and west central parts of Alabama is reported by the forestry commission of that State.

More Than a Million Deer in Pennsylvania

An open season on female deer, with yearlong protection for bucks, has been declared for 1928 by the Pennsylvania Game Commission. Game officials estimate that there are now in Pennsylvania 45,000 male deer over 2 years of age, more than 1,000,000 does, and only 1 fawn to 10 does. In some districts heavy losses of fawns have occurred, evidently from starvation. Other consequences of the large increase in deer in the State, according to the results of an investigation by Vernon Bailey, of the Bureau of Biological Survey, have been destruction of forest plantations, damage to farm crops, and partial destruction of certain species of plants, shrubs, and trees. In an endeavor to provide against further damage to farm crops the State game commission is supplying farmers with materials for deer-proof fences.

❧

Spring work on the State forests of New Jersey included experimental planting of wild stock of southern white cedar on wet lands on the Bass River and Stokes Forests. A trial planting of Scotch and jack pine was made by the State forestry division on the south Jersey "plains," along the Barnegat-Chatsworth Road.

❧

Bald cypress trees provided by the Maryland Department of Forestry have been planted by three neighboring landowners along a mile of the Robert Crain Highway, just south of Upper Marlboro. Another planting of bald cypress has been made by the Point Lookout Co. along a mile of road on the southernmost tip of the western shore.

A tract of between 600 and 700 acres in North Carolina, about 3 miles west of Reidsville, has been given to the State by Jefferson Penn, of Reidsville, as a State forest and game refuge. The land lies along Wolf Island Creek, near the Reidsville-Wentworth Highway. Part of it is forested, with both hardwoods and pines.

* * *

The forest protection system of Wisconsin is being extended this year over 80 townships not previously covered and has been withdrawn from 39 townships. The net increase of about 950,000 acres brings the protected area to a total of about 14,800,000 acres.

* * *

Thirty-five counties of California are cooperating with the State this year in forest fire protection, as compared with 30 in 1927.

Ohio Conservation Council Formed

For the purpose of working for the creation of a State department of conservation in Ohio and for the enactment of conservation laws by the next legislature, a State conservation council has been formed by the Ohio Federation of Women's Clubs, the Izaak Walton League, the League of Ohio Sportsmen, the Ohio St Grange, the Ohio Farm Bureau Federation, and t Ohio Chamber of Commerce. Mrs. George McDonald was chosen as the council's temporary president, James W. Stuber as temporary secretary, C. A. Dyer as chairman of the committee on program and policy, and F. C. Furniss as chairman of the committee on constitution.

* * *

Blister rust control work in Vermont during 1927 included the pulling of 280,781 currant and gooseberry bushes from 19,405 acres of land, to protect approximately 5,900 acres of white pine.

Education and Extension

Additions to Staff and Plant of Arnold Arboretum

A new and larger greenhouse is being erected at the Arnold Arboretum of Harvard University, at Jamaica Plain, Mass. In this greenhouse, which will occupy a site on the South Street side of the arboretum, there will be a laboratory fully equipped for research in pathology and genetics, a workroom for potting, and pits for growing woody plants. The greenhouse will be about 50 feet long. It is to be adjoined by a new nursery covering about 3 acres of land.

A most important phase of arboretum work—hybridization, and the study of living conditions and diseases of plants with a view of improving their inherent qualities—has never been attempted at the Arnold Arboretum because of lack of the necessary facilities. Up to the present time the work carried on at the arboretum has consisted mainly of assembling woody plants and trees from all parts of the world, identifying, classifying, and propagating them and exchanging them with other arboreta and nurseries, and building up a library and herbarium. With part of the $1,000,000 endowment now being raised as a memorial to Charles Sprague Sargent, late director of the arboretum, two departments of research are to be established, one in pathology and one in genetics. The work in genetics will be supervised by Dr. Edward M. East, of the Bussey Institute. There is to be added to the staff a systematic botanist whose field will cover the woody plants of tropical America. It is planned to offer opportunity for special work in dendrology to men who wish to obtain the doctor's degree in this field.

The Arnold Arboretum was established in 1872 for the study and cultivation of all woody plants capable of withstanding the climate of Massachusetts. The original endowment was $100,000, given to Harv University by a local merchant. In carrying out t trust Harvard set aside 125 acres of land known as the Bussey farm. By an arrangement with the city of Boston the Arnold Arboretum is assured of its present site for 1,000 years and is tax free. The roads in the arboretum are maintained by the city as part of the park system. Under Professor Sargent's guidance the endowment was increased to more than $1,000,000 and the area to 260 acres. The arboretum now includes more than 6,500 species and varieties of trees, shrubs, and vines.

Of the projected Sargent memorial fund of $1,000,000 more than $900,000 has been collected.

* * *

The forestry division of the University of California, Berkeley, Calif., and the California Forest Experiment Station are promised new and larger quarters in a building which they are to share with the university's division of agricultural economics. The new building, construction of which will begin this summer, is to be paid for with funds from the endowment created by A. P. Giannini, president of the Bank of Italy, San Francisco.

Fire Tool Boxes by Popular Subscription

Ralph L. Morgan, under whose leadership the town of Richmond, N. H., has acquired distinction as a community of tree planters, has proposed to his townspeople this season that they protect their plantations by providing boxes of fire tools. Writing as one whose own property is already protected, in a circular letter dated June 15 he calls on property owners of the town to "chip in" and buy an adequate supply of shovels, rakes, hoes, mattocks, wire brooms, axes, saws, 5-gallon pump tanks, etc. Such tools are furnished to New Hampshire towns by the State forestry department at half wholesale price. According to Mr. Morgan's plan the tools would be painted red and branded, and lots sufficient to equip 15 men each would be placed at intersecting roadside locations in sealed red boxes marked "Forest fire fighting tools; property of the town of Richmond."

Mr. Morgan exhorts his fellow townsmen as follows: "Some of you can well afford to give the town of Richmond the price of a complete box fully equipped. Others might give the price of a dozen shovels. Some child can contribute the price of a pail.

"Every single individual can help in some way. Give a day's time to help paint the tools and boxes when we get them. We want everyone to contribute something so that all may have a personal interest in this practical work. Remember that prevention of fire is better than fire insurance.

"Some member of our forestry committee will call upon you folks here in town. All money will be turned in to Harold Dickinson, town treasurer. You out-of-town people who own two-thirds of the forest lands in Richmond will find inclosed a pledge card which you will kindly fill out and mail together with your checks in the inclosed envelope to Mr. Dickinson.

"Come on, now! Let's all pull on the same rope, the same way, and at the same time.

"Richmond is coming back."

Mr. Morgan's work in reforestation and in developing community spirit makes a singularly inspiring story. Having made a personal success as an engineer and inventor, he gave up active business to return to Richmond, which had been known to him in boyhood as a locality rich in virgin forest but had since been stripped of its timber. There he bought and rebuilt as his home a farmhouse whose beams date from pre-Revolutionary days, acquired 500 acres of idle forest land, and began his plantation. He contracted with a professional nurseryman to plant 10 acres of pine land a year for three years, and had his local planting crew watch the work. At the same time he began to raise trees from seed on a large scale.

Mr. Morgan's example promptly took effect on the people of the community. During the third season of the work he gave 250,000 trees to neighbors who agreed to plant them on their own property. The same season he transferred 220,000 young trees raised in the State nursery to his own nursery, from which he later offered to distribute transplants free of charge. To-day Richmond has a town forest of 846 acres, and 27 of the town's property owners last year planted on their land a total of 250,000 pine trees.

The plan by which the town of Richmond undertakes to carry out forest planting operations for nonresident landowners was described on page 4 of the FOREST WORKER of May, 1927.

West Coast Firms Send Out Fire Prevention Propaganda

The Pacific Coast Cone Co. has notified the Portland (Oreg.) office of the United States Forest Service that it will use forestry slogans on 2,000,000 pieces of printed matter this year and annually hereafter. This includes not only the company's letterheads and advertising leaflets but the labels on its ice-cream-cone boxes, which are used by auto campers as containers on running boards. The Portland Box & Label Co. has just issued gummed labels bearing 12 different forest-protection slogans in red, with attractive borders, which they offer at 50 cents per 1,000. These steps have been taken in response to a letter recently addressed by the Portland office of the Forest Service to the Oregon Manufacturers' Association, inclosing a copy of the "smokers' code" and a page of suggested slogans. Fourteen other firms have responded promising to cooperate in such ways as using slogans on stationery, using the "smokers' code" as an envelope stuffer, and placing special fire-prevention posters over employees' time clocks.

Pennsylvania Women's Clubs to Plant the Highways

The Pennsylvania Federation of Women's Clubs is making a special effort this year toward the beautification of the State's highways and is urging that individual clubs undertake to plant trees along a mile of highway. The State highway department makes a free offer of the services of planting crews to clubs that order trees for this purpose from the department of forests and waters. A general planting project was carried out by the federation with good success in the year ending November, 1926, when club members planted 95,956 trees. Mrs. Hamme, president of the State federation, offered a prize of $25 to the club planting the greatest number of trees, which was won by the Abington Woman's Club, Clarks Summit, with a planting of 21,321. Mrs. Mary Flinn Lawrence, of Pittsburgh, offered $20 to the club planting the greatest number of trees in proportion to its membership, which was won by the 16-member Triology Club of Biglersville with a planting of 2,165.

Specialization Permitted in Undergraduate Forestry Course at Pennsylvania State College

A certain degree of specialization in undergraduate work is being permitted by the forestry department of the Pennsylvania State College. Students of high standing who show natural inclination along particular lines of forestry work are allowed as early as the sophomore year to elect courses that constitute preliminary training in chosen specialties. Such students are not, however, exempted from any part of the essential training in forestry. During the past school year one sophomore combined forestry and chemistry with the aim of developing himself as a chemist in forest products, and two others combined forestry and animal husbandry with a view of future specialization in range management. These students will have opportunity before graduation to elect at least six courses in their particular field. In the junior class two men combined forestry and botany in preparation for forest pathology; two combined forestry and soils, for work in forest soils; two combined forestry, soils, and botany, for forest research; one combined forestry and entomology, for forest entomology; and one combined forestry and education, for teaching. These students will be able to elect from four to six courses in their chosen field.

The four standard courses offered by the department are in general forestry, lumbering, wood utilization, and city forestry.

Planting Demonstrations in Southern Idaho

Ten demonstrations of correct methods of planting woodlands, shelter belts, and windbreaks on Idaho farms were given this spring by Extension Forester A. M. Sowder in various counties in the southern part of the State. In sections of southern Idaho where tree growth is badly needed Mr. Sowder made two experimental plantings. In one of these he planted 20 different species of conifers and hardwoods on alkali soils, and in the other he planted 16 different species of hardwoods and conifers at an altitude of 6,200 feet.

Demonstration Plantings Established in 45 Pennsylvania Counties

At the end of 1927, 300 demonstration plantings of forest trees had been permanently established on Pennsylvania farms by the State extension service. The demonstration areas on which 302,000 trees were planted in 1927 are located in 45 different counties. The 130 meetings held on these areas during the year attracted a total attendance of 2,153.

Montana School Plans Miniature National Forest

On the 1,366 acres of national forest land which it has been authorized to use as a school forest the School of Forestry of the University of Montana plans to develop "a miniature national forest as such national forests are supposed to exist 200 years from now," Prof. F. G. Clark writes. This land, part of the Fort Missoula Wood and Timber Reservation, is located in the edge of the Missoula National Forest and close to the university buildings in Missoula. Early in 1927 its use was granted to the university for an indefinite period, under a permit issued by the United States Forest Service with the agreement of the commander of Fort Missoula. Plans for its management cover grazing, timber sales, recreation, and other activities represented in the management of a national forest. It is hoped that timber from the tract may suffice to keep busy for an indefinite period the small sawmill already set up by the forestry school on adjacent land. In the larch and Douglas-fir type, which largely predominates on the area, and also in the western yellow pine type it is planned to carry out experiments in timber marking and brush disposal and intensive studies of cut-over areas. Sample plots are to be laid out for study of the growth acceleration resulting from various degrees of thinning.

Demonstration Plantings in Western Oklahoma

In order to interest farmers of the prairie section of Oklahoma in the possibilities of tree planting for windbreak, wood lot, and ornamental purposes the Oklahoma Forest Commission has this year established five experimental and demonstration plantings in the western part of the State, using Scotch pine, Chinese elm, black walnut, and bur oak. Now the commission is arranging for lectures and motion-picture showings before meetings of Izaak Walton League chapters and similar gatherings in about 60 towns of the section. A short lecture will be given with slides showing species of trees desirable for specific purposes, correct planting methods, and the like, and following this the commission's portable motion-picture outfit will be used to show moving pictures of forest planting work on the sand hills of Nebraska, the reel From Seed to Sawmill, and a game picture, When Elk Come Down.

* * *

A seed-gathering campaign put on by the extension service of Georgia in 1927 resulted in the collecting of 52 pounds of loblolly and 18 pounds of slash pine seed, at a cost of $2.50 to $2.75 per pound. Most of the work was done by forestry students of the Georgia Agricultural College.

Parent-Teachers Associations Establish School Forest

For three years after educational leaders of Jamestown, N. Y., began to think that the city should have a school forest they found no way to establish one, because it was contrary to law for a city school to own operty outside its city limits. In the fall of 1927, wever, the board of education met this difficulty by forming a membership corporation called the Jamestown Schools Forests (Inc.). With the assistance of J. E. Davis, county forester of Chautauqua County, the corporation located a suitable abandoned farm of 150 acres 4½ miles from the city, and with funds donated by parent-teachers associations of Jamestown this land was bought at $10 an acre.

In April, 1928, seniors from the central high school of Jamestown planted 20,000 trees on the farm as a memorial of their class. The plan is for each outgoing class of the high school to make a similar planting until the entire farm is reforested—and then to purchase adjoining abandoned lands on which to continue the planting.

Since a new law of New York State removes the obstacle to ownership by the board of education, the corporation intends to turn the school forest over to the board as soon as its financial obligations have been met.

Weekly Forestry Lessons Prepared for Alaska Schools

A series of "forest lessons" for the children of the terior of Alaska was prepared by M. L. Merritt, of e United States Forest Service, at the request of the 1928 American Forest Week committee of the Territory, headed by Governor Parks. The lessons not only emphasize the importance of forest conservation but are designed to stimulate love of the woods through training in woodcraft and knowledge of forest lore. The committee distributed 121 sets of the lessons to the Territorial schools, 168 to the Government schools, and 21 to the mission schools. The lessons are intended to be used one a week and thus to carry the impetus of the American Forest Week effort through the school year.

* * *

Four–H Club boys of Butler County, Pa., contracted last year with Dr. H. C. McClymonds to set out 80,000 trees on his farm. The boys earned $400 during spare time, and since about 90 per cent of the trees lived the landowner was well satisfied. Another group of Pennsylvania boys, in the Picture Rocks Vocational School, made $110 or more by improvement cuttings on about 5 acres of woodland. The boys marked the trees for cutting according to ideas given them by the State extension forester, cut them into logs and fuel wood, and sold the product.

Successful Forestry Contest for School Children

About 400 of the public-school children of Modoc County, Calif., competed this spring in the American Forest Week contest arranged for them by George Lyons, supervisor of the Modoc National Forest. Instead of a forest fire prevention essay only, as in last year's contest, Mr. Lyons required of each contestant a slogan, counting 10 points; an essay on "How I can best prevent forest fires," counting 50 points; and answers to a set of 40 forestry questions, counting 40 points. The children were classed in three groups, one for the fifth and sixth grades, one for the seventh and eighth grades, and one for high school. For the preliminary contests the county was divided into four districts. First and second best papers from each class of contestants in each district were selected by school-teachers and sent to Mr. Lyons, who had the help of local judges in making awards. As in 1927, the children winning first place were given a three-day trip to the Lava Beds National Monument and those who ranked as second best were taken on a one-day trip to Happy Camp Lookout.

* * *

During the spring months of this year Extension Forester F. W. Dean, of Ohio, made 98 farm visits with county agents to determine what kind of trees should be planted on different sites. He held 65 forest planting demonstrations in 20 counties, 15 of them in Jackson County. Owners of land adjoining main highways were asked to locate their plantings along the highways if possible, and as a result 25 of the plantings are so located. In five counties plantings were made on school property not in use as playgrounds.

* * *

West Virginia landowners planted 102,500 seedlings and transplants in the spring of 1928, Extension Forester Skuce reports.

* * *

Boy Scouts of Cumberland, Md., planted 7,000 trees this spring. More than 150 scouts took part in the planting of 4,500 Scotch pines on the Shriver Hill, April 21. On the following Monday evening the Monarch Club entertained the boys with a supper at the Y. M. C. A. and a motion-picture program, including films of the scouts' planting work.

* * *

Through arrangement by the American-Scandinavian Foundation, one forestry graduate each from Norway, Sweden, and Denmark has come to the United States this summer for temporary employment with the United States Forest Service.

Forest Service Notes

The Government Pays for the Waterville Tract

The United States Treasurer's check for $997,978 went forward on June 5 in payment for the Waterville tract in the White Mountains of New Hampshire, which includes the headwaters of the Mad River. The 23,123 acres of land thus acquired by the Federal Government becomes part of the White Mountain National Forest. Through this purchase one of the largest tracts of merchantable timber in the mountains of New England is assured of conservative lumbering leading to permanent timber production. Federal control also insures protection of the remarkable scenic attractions of the Greeley Ponds and the Mad River Notch. On the area surrounding these features, and on certain areas of high slopes, all timber will be held without cutting. Of the merchantable timber outside these reserved areas 85 per cent will be resold to be cut under Government regulations and 15 per cent will be held for further growth, for seed trees, and for the protection of trails.

Large Timber Sale to Help Suppress Pine-Beetle Epidemic

The Forest Service is advertising about 400,000,000 feet of timber, over 99 per cent western yellow pine, on the Modoc National Forest, Calif. This timber is intermingled with about 600,000,000 feet on land owned by the Pickering Lumber Co. In this region there is one of the worst infestations of the western pine beetle (*Dendroctonus brevicomis*) of which we have record. The sale, which will mean the establishment of a new unit of pine-lumber production, has been approved solely because of the necessity for action in salvaging as much as possible of the infested and killed timber and for getting the benefits of the operation in helping to suppress the epidemic. The terms of sale require immediate action by the purchaser, who is to log the infested timber on at least 15,000 acres of Government and private lands included in the sale unit within the first year. The corporation that has applied for this timber plans to put in at least one portable sawmill, which would saw ties and construction timber from these infested logs, burning the bark and slabs currently. It also plans to log infested timber to the line of the logging railroad and proposes to haul the logs to the sawmill site and there place them in water, thus drowning the beetles. It is hoped to h[illegible] the railroad completed and the logs moving to [illegible] pond before the time of beetle emergence in the summer of 1929. The purchaser's main sawmill must be completed by October 1, 1929.

A 30-day period of advertisement has been approved, ending August 4. This period may be extended by 60 days if a request for such extension is received from an operator of known financial responsibility who will agree to bid if, upon investigation during the extended period, he finds the facts to be as represented by the Forest Service.

The conditions of sale require that the purchaser construct a sawmill of the band type within Modoc County, Calif., as his main mill for the manufacture of the timber.

Diameter and Defect Limits for Profitable Cutting of Inland Empire Pines

Western yellow pine 18 inches in diameter and western white pine 14 inches in diameter are the smallest that can be cut and milled at a profit, according to figures compiled by M. I. Bradner, chief of the office of forest products of the Northern National Forest District. These diameter limits are based on aver[illegible] production costs and average values for 1921–19[illegible] inclusive, including allowances of 10 per cent for interest and risk and of 5 per cent for defect in the yellow pine and 10 per cent in the white pine. Defective yellow-pine logs under 12 inches and defective white-pine logs under 9 inches are ordinarily taken out at a loss. The amounts of defect allowable in logs of various diameters for logging and milling at a profit, with no charge for stumpage, interest, or risk, are as follows:

	Per cent
Western white pine:	
9-inch logs	20
13-inch logs	25
14-inch-butt logs	36
20-inch (1, 2, or 3 grade) logs	41–50
Large butt or middle (select) logs	60
Western yellow pine:	
12-inch logs	10
15-inch (shop) logs	20
18-inch (common) logs	20
17-inch (select) logs	31–40
22-inch	41–50
27-inch (butt or middle)	51–60
Few large select logs	Over 60

How to Estimate Wind Velocities

The important bearing of wind velocity on forest fire hazard and on the rate of spread of fire has long been recognized; but until recently foresters have had no common and simple basis for describing wind velocities. Consequently what one fireman would call a strong wind has been described by another as a gale. A com[illegible] medium for more accurate estimating of wind velocity is supplied by the Beaufort wind scale, which uses the effect of the wind upon various common objects as a criterion of its velocity. This scale has been used by the Weather Bureau in its forecast work for many years, has been adapted by mariners, and has stood the test of time both on land and on sea. For use in describing the behavior of forest fires the United States Forest Service is adopting a modification of the Beaufort wind scale which is as follows:

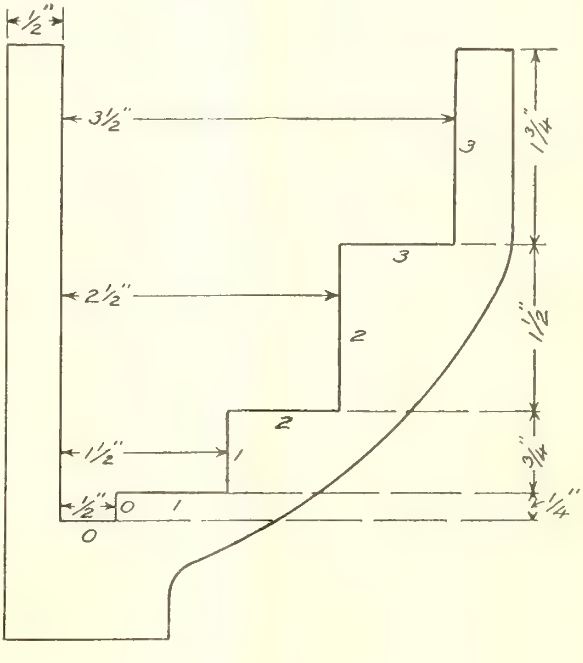
Descriptive term	Velocity (miles per hour)	Method of estimating velocity
Light	0–7	Direction of wind shown by smoke drift; wind felt lightly on face; leaves rustle.
Gentle	8–12	Leaves and small twigs in constant motion; wind extends light flag.
Moderate	13–18	Raises dust and light litter; small branches are moved and swayed.
Fresh	19–24	Small trees in leaf (hardwoods) begin to sway. Crested wavelets begin to form on inland waters.
Strong	25–38	Large branches or whole trees in motion; inconvenience felt in walking against the wind; whistling in telegraph wires.
Gale	39–54	Breaks twigs off trees; wind generally impedes progress; slight structural damage to buildings.
Whole gale	55–75	Trees uprooted; much structural damage.
Hurricane	Over 75	

Oak Growth and Yield Study

The Central States Forest Experiment Station is continuing this year the study of the growth of oaks which Director E. F. McCarthy has had under way for several years. Stands of even-aged second-growth oaks have been measured in many parts of the Eastern States, particularly in the localities where the oak stands were clean cut for charcoal before the day of coal. In order to make the study truly regional the entire range of oaks throughout the East will be covered. Plots on which the stands contain as little as 30 per cent of oak are being measured for yield, though the bulk of the data is being taken in stands of which oak amounts to 75 per cent or more. Because it is necessary to prepare complete sets of volume tables for the many species commonly growing in the mixed hardwood stands, a vast amount of data must be accumulated. Accordingly State foresters, the eastern forest schools, Federal forest officers of the Eastern National Forest District, and consulting foresters are being asked to assist by furnishing volume data on individual trees. As one phase of the study, this summer the Appalachian Forest Experiment Station is cooperating with the Forest Products Laboratory in a mill-scale study on several of the eastern national forests. Other cooperators in this study are the Office of Forest Pathology, the Office of Forest Insect Investigations, and the Eastern National Forest District. Data obtained in this mill-scale study will show the percentage of loss due to decay from fire, insects, and fungi, besides furnishing volume data and a check upon utilization practices. Because of its ramifications, the wide territory to be covered, and the large number of species involved, this study is by far the most ambitious growth and yield project so far tackled by the Forest Service.

A Handy Caliper for Small Trees

A simple caliper that can be quickly cut from one-sixteenth-inch sheet copper or brass has been devised by Lester H. Reineke, of the United States Forest Service. Its shape and dimensions are shown in the accompanying sketch. When this caliper is slipped over a tree at breast height the notch into which the tree fits indicates its diameter class. The largest notch is for 3-inch trees (trees 2½ to 3½ inches in diameter), the next for 2-inch trees, the next for 1-inch trees, and the smallest for trees with diameters of less than 1 inch. Many 4-inch trees—those that are but slightly larger than the largest notch—can also be measured with this caliper. This rig is very handy in measuring reproduction strips or sample plots in very young stands.



A Quick Test for Moisture Content of Hardwood Litter

A quick and fairly accurate method of determining the moisture content of hardwood litter has been worked out by E. F. McCarthy, director of the Central States Forest Experiment Station, in connection with his fire studies in the southern Appalachians. The test consists merely in bending leaves picked up from the forest floor, for the manner in which the leaves break indicates roughly how much moisture they contain. McCarthy's classification is as follows:

Leaves with from 20 to 40 per cent moisture content crack if creased, but do not entirely break.

Leaves with from 14 to 20 per cent moisture crack if folded more than to a right angle.

Leaves with an average of about 14 per cent moisture crack when bent to a right angle but do not break freely, especially in the veins.

At an average of 10 per cent moisture, leaves break entirely apart if bent to a right angle. Litter at 10 per cent moisture breaks up if crushed in the hand, but does not crumble into small pieces.

Freshly fallen leaves are tougher at any given moisture content than those which have been dried and become saturated again.

While the heavier leaves, such as those of the post oak, crack and break with higher moisture content than the thinner leaves such as those of white oak, the variation is not great.

Snag Shooting Tests

In snag-felling tests carried out during the past winter on the Mount Hood National Forest, Oreg., promising results were obtained by using high explosives in holes bored in the snags with a portable automatic auger. The tests were made by members of the Portland office of the Forest Service, C. S. Cowan, of the Washington State Forest Fire Association, and representatives of E. I. du Pont de Nemours & Co. The automatic auger was supplied with power by a Delco-light unit, placed on a truck, with which it was connected by a flexible cable 1,000 feet long.

Earlier experiments in which holes for the insertion of explosives were bored with a hand auger had not demonstrated any saving of time or expense over the old method of sawing or chopping. With the automatic auger, the use of explosives instead of a saw effects a great saving of time. When the saw is used, from 70 to 80 pounds of bulky equipment must be carried from snag to snag, the work is physically hard, and the men must rest between fellings. Men taking turn about in handling the 18 to 25 pound drill head and stringing out the cable do not tire quickly and need not lose nearly so much time. In the Mount Hood tests a very tall snag 59 inches in diameter, having great quantities of pitch, was felled in 39 minutes by boring and shooting. Experienced fallers estimated that to fell this snag with the saw would have required from 3 hours to half a day.

Sound Douglas-fir snags from 36 to 82 inches in diameter prepared with from 6 to 11 holes and loaded with from 29 to 41 sticks of 40 per cent gelatin were successfully felled, in most cases being cleanly sheared off.

It was found that the direction of fall of a snag could be controlled to a great degree by the placing of the holes and by the angle of drilling. The experiments suggest that holes should be bored at a tangent rather than radially, since the latter method may result in overloading at the center.

Experiments made at the same time in felling snags by loading T. N. T. cartridges in notches and by girdling the snag with a cloth tube loaded with dynamite or T. N. T. gave unfavorable results, in most cases failing to fell the tree and sometimes resulting in flames rolling out a considerable distance.

Further experiments in felling snags with explosives are to be carried out by the Forest Service and cooperating agencies.

National Forest Reservation Commission Approves Land Purchases

At its May 23 meeting the National Forest Reservation Commission approved a purchase program covering 163,053 acres of land. This brings to a total of 187,030 acres the areas approved by the commission for purchase for national-forest purposes since January 1, 1928. The most important tracts approved at the May meeting are the wild Ammonoosuc lands of the International Paper Co. on the White Mountain National Forest; 20,000 acres of Central Pennsylvania Lumber Co. lands on the Allegheny National Forest; and four tracts on the Monongahela National Forest, including lands of the Preston Land & Lumber Co., the West Virginia Coal & Timber Co., and the Wildell Lumber Co., and the Chaffey land formerly owned by the Glady Manufacturing Co.

There was before the commission a proposal to establish three purchase units in Wisconsin, the most important of these being the Oneida unit in the northeastern part of the State; but since the assent of the governor, which is required by law before any purchase area can be approved by the commission, was not received until after the meeting had adjourned, authorization was deferred. This will be taken up at the next meeting.

In response to the appeal of a delegation that appeared before the commission urging establishment of a national forest in Vermont, an investigation is to be made this summer with a view of examining areas in that State that might be suitable for a national forest.

The forest district embracing the Lake States is already competing strongly with the Appalachian region in area of land purchased for national-forest purposes. It contributed 62 of the 250 cases approved by the commission in May, including 25,174 acres in additions to the Superior National Forest and 12,512 acres in additions to the Michigan National Forest.

Broadcast Sowing in Seed Beds at Savenac

At the Savenac Forest Nursery of the Forest Service, in western Montana, broadcast sowing is practiced according to improved methods that offset the advantages of drill seeding. In seed beds sown broadcast overcrowding is usually a troublesome factor; but thorough study of the characteristics of the seed and the requirements of the species the Savenac nurserymen have learned how to obtain proper spacing. Drill sowing has formerly had an advantage in that roots of drill-sown stock can be readily pruned in place by the use of a U-shaped drawknife; but a root-pruning implement has not been developed that will prune a whole bed of seedlings in one operation. A cart that straddles the 4-foot bed carries a blade that can be set to any one of several depths underground. As the cart, weighted down by the driver, is pulled along by horses, which follow the paths on either side, the blade passes under the entire bed.

The main advantages of broadcasting over drill sowing are the smaller initial cost of the sowing; the comparatively small ground space required with consequently smaller cost of soil preparation, weeding, watering, mulching, and other care; and the greater ease of supervision owing to concentration of work on a smaller area.

It has been found highly desirable to sow more beds rather than to raise seedlings in beds densely overstocked. The ideal densities for producing nursery stock have been determined by D. S. Olson, in charge of planting at the nursery, to be as follows:

Species	To produce seedlings for planting in the field		To produce seedlings for transplanting in the nursery	
	Age at planting (years)	Number per bed of 48 square feet (4 by 12 feet)	Age at transplanting (years)	Number per bed of 48 square feet (4 by 12 feet)
Western yellow pine	2	2,400	1	5,000
Western white pine	2 3	4,000 3,000	1 2	7,000
Western larch	2	2,000	2	5,000
Engelmann spruce	2 3 4	2,500	2 3	5,000
Douglas fir	3	2,500	2	7,000
Western red cedar	4	2,500	3	4,000

In sowing seed of western white pine at the Savenac nursery, it has been found desirable to alter the depth to which the seed are covered according to the season. The fall-sown seed are covered to a depth of five-eighths inch, while a depth of three-eighths inch is found sufficient for spring sowing. The greater depth in the fall-sown beds reduces the danger of frost heaving. Seed of most other species are sown in the spring. Douglas fir and western yellow pine are covered three-eighths inch; western larch, Engelmann spruce, and western red cedar, one-fourth inch.

Engelmann spruce, western red cedar, western larch, and Douglas fir are found to require shade the first year in the seed beds. Engelmann spruce is not exposed to full sunlight in July and August until the third year, while cedar in the nursery suffers at all ages unless shaded on hot, bright days. Western white pine sown in the fall germinates well the following spring, so that the seedlings become lignified (woody) by midsummer and are therefore able to withstand the hot sun without shade. If seed of this species are sown in the spring, as is rarely desirable or necessary, the seedlings require shade the first summer. The western yellow pine does not require shade.

Natural Area Dedicated

The May outing of the Tucson Natural History Society, Tucson, Ariz., this year was made the occasion of exercises in dedication of the Santa Catalina Natural Area. This is the tract of 4,464 acres in the Marshall Gulch region of the Santa Catalina Mountains, within the Coronado National Forest, that was set aside by the Secretary of Agriculture in March, 1927, as an area to be preserved in its natural condition. The Tucson society, which is largely responsible for the decision to preserve the tract as a "natural area," was addressed at this time by Dr. C. T. Vorhies, University of Arizona; Dr. Forrest Shreve, Carnegie Desert Laboratory; J. D. Jones, United States Forest Service district office, Albuquerque; G. A. Pearson, Southwestern Forest Experiment Station; and Dr. Walter P. Taylor, Bureau of Biological Survey. The purpose and significance of the preservation of natural conditions on this area were expressed by Mr. Pearson as follows:

"The naturalist of to-morrow, whether he seeks to unravel the mysteries of science or whether he is merely one of those who love to dwell in the presence of nature, is going to treasure each bit of nature that has escaped the despoiling hand of man. Speaking for the scientist, I have in mind especially the student of plant and animal life. Biologists are coming more and more to recognize that if they would comprehend the laws governing the intricate relationships between living things and their natural environments, they must study these relationships as nearly as possible under natural conditions. The action of plant upon plant, of animal upon animal, of animal upon plant and vice versa, and the interaction between plants and animals on the one hand and natural environment on the other are still but vaguely understood.

"In utilizing Arizona's two great living natural resources, the forest and the range, it is of utmost importance to work in harmony with rather than in opposition to biological laws. Man can direct and assist nature, but before he can do this he must learn nature's ways. The forest under scientific management can be made more productive than virgin timberlands, but it will not afford adequate opportunity for a study of natural relationships. The managed forest will not be permitted to attain the great age of virgin stands. It will be denser and the trees will be smaller than in the original forest. Herbaceous vegetation will be subordinated and animal life will be modified. Range lands under conservative use will probably approach the original state more closely than at present, but there is no assurance that even under careful management the original composition will be perpetuated.

"The Santa Catalina Natural Area, which through the foresight of the Tucson Natural History Society is being dedicated to science, is primarily a forest area, and as such it is also the natural home of birds and mammals. Situated as it is within a few hours' journey from a great institution of learning, it is anticipated that this area will attract many research workers in plant and animal ecology. By virtue of its location at the summit of a high mountain difficult of access for purposes of exploitation, the Santa Catalina area approaches more nearly the primeval state than most forest areas in the Southwest. By judicious supervision this condition can be maintained and even improved. Obviously the area should be closed to all forms of commercial use and human occupancy. Aside from protection against fire and other destructive agencies, human interference must be restricted to a minimum. Man's impulse to exterminate predatory animals, for example, must be curbed, otherwise we may have, as on the Kaibab Forest, an abnormal increase of deer and other vegetarian animals at the expense of plant life. Even rodents and insects should be regarded as playing an important rôle in nature's scheme. In brief, the aim should be to preserve a natural area such as nature would have it."

Smoking Restricted on California Forests

Smoking is banned on the 18 national forests of California and southwestern Nevada this season as in the summer of 1927, being permitted only in camps and at places of habitation. The antismoking order went into effect June 10, and with it the order requiring that motorists and pack train parties entering these forests provide themselves in advance with shovels and axes suitable for use in fighting forest fires.

◆

Headquarters of the Appalachian Forest Experiment Station, Asheville, N. C., have been moved from the New Medical Building to the new city hall. The latter building now contains, also, the offices of the supervisor of the Pisgah National Forest and of the Great Smoky Mountain National Park Commission.

Noble Fir Seed Keep Well in Cold Storage

Seed of the noble fir (*Abies nobilis*) kept in cold storage remain viable in large proportion at the end of five years, according to the results of an experiment carried through that length of time by the Pacific Northwest Forest Experiment Station. The experiment was undertaken for the reason that this speci[illegible] favored for high altitude planting, does not produc[illegible] good seed crop every year, and that under ordinary storage conditions its seed do not remain viable through the three or four year period that may intervene between good seed crops.

In 1921 six lots of noble-fir seed, each lot consisting of four 1-pint samples, were prepared for the experiment by being well dried and then placed in air-tight glass jars. Four lots were given chemical treatment, one each with formaldehyde, sulphuric acid, copper sulphate, and hydrochloric acid. The four lots thus treated were stored at ordinary room temperature, along with an untreated lot. The sixth lot was placed in the cold-storage plant of Swift & Co., where it was kept at temperatures of from 9° to 14° F. Cutting tests and germination tests of all lots were made in 1922, 1923, 1925, and 1926.

The chemically treated seed showed up well in the cutting tests, but none of them germinated. Since no record was kept of the strength of solutions or of the method used in treating these lots, the results obtained in this experiment are inconclusive as to the possibility of preserving the seed by chemical treatment. At the end of a year the untreated seed kept at room temperature were 71 per cent sound, according to cutting tests, but only 6 per cent of th[illegible] germinated. In later seasons, cutting tests of t[illegible] lot continued to show a high percentage of sound seed but none of the seed germinated.

In the case of the seed placed in cold storage, the four successive cutting tests showed an average of 58 per cent of sound seed, and germination tests showed a viable proportion averaging just a shade under 21 per cent of the total number of seed tested. As a matter of fact, there was an apparent increase in the viable proportion from 14 per cent of all in the first year to 34 per cent in the fourth. This is attributable to the fact that in the first germination tests the seeds were examined late and infrequently. In the final test, that of 1926, the proportion germinating dropped to 13 per cent of all. According to the results of the cutting tests it appears that the proportion of sound seed in this lot that germinated, in the four different tests, averaged a trifle under 36 per cent.

Four years' cold storage seems to have left the seed with as high a percentage of viability as one year's storage under methods now commonly used. In 1923 some noble fir seed were placed in screw-top glass jars and stored in the cold cellar of the Wind River Nursery where temperatures ranged from 32° to 45° F. At the time when these seed were placed in storage a cutting test of 300 seed showed 53 per cent sound, and a germination test of a sample sent to the Oregon Agricultural College showed that 34 per cent were viable. When the stored seed were sown in the nursery in the spring of 1924, only 20 per cent of them germinated.

The findings of this study agree with those of earlier investigations in seed storage. Reporting on a series of experiments made in Germany with pine seed harvested in 1905 and 1906, Oberförster Haak wrote: "Keeping seed on ice in air-tight bottles proved under all conditions an improvement over other methods, especially as regards germinative energy. This, as some experiments showed, may be due to the fact that the cold inhibits the carbonic acid formation and consequent loss of substance due to respiration of the seed." He added that the seed should be dried before storing, and suggested that the best practice in drying the seed might be to place it in the sun or in a well-warmed room for a few days until it had lost from 1 to 2 per cent of its weight.

A second five-year experiment in cold storage of noble fir seed was begun by the Pacific Northwest Forest Experiment Station in 1926, with the purpose of checking possible errors in technique in the first experiment and determining whether the germinative power of the seed can be better conserved by storing them with wings attached, as is done by some European foresters.

* * *

Headquarters of the Cherokee National Forest, Tenn., are being moved July 1 from Knoxville, Tenn., to Athens, Ga., where they will occupy offices in the new Federal Building.

General Forest News

Drought-Resistant Pines

By Lenthall Wyman, United States Forest Service

How prolonged droughts may aid in establishing climax types was demonstrated in 1927 in the sand-hill region of northeastern Florida. In the original forest of this region the characteristic tree was the longleaf pine, and there was a scattering of small oaks. After the removal of the old growth and repeated fires a temporary type came in composed of *Quercus catesbaei*, *Quercus cinerea*, and *Quercus geminata*, with a few longleaf pines and some pawpaw and blackberry bushes. The soil is medium to coarse sand with little or no humus or clay and with no hardpan or heavy subsoils to a great depth.

For several months prior to March, 1927, there was a deficiency of rainfall, and during the 11-week period from March 21 to June 6 only three very light showers occurred, with a total of 0.56 inch of rainfall. Maximum temperatures reached 105° and the relative humidity went as low as 11 per cent, with 23 per cent as the average minimum over a 10-day period.

In late May it was noticed that the oaks were dying in patches here and there, and the mortality continued until the first heavy rains early in June. It was thought that root disease might have been the cause of death; but this explanation was discarded when it was noted that many trees which had been almost dead just before the rains sent out sucker shoots near the ground and along the lower part of the stem when abundant soil moisture became available.

Although all three species of oaks died off, the pines pulled through, and even such underbrush as pawpaw and blackberry survived. It may be that the deciding factor favoring the one tree species over the others was the fact that whereas the oaks have a lateral root system 18 to 30 inches underground with no tap roots the pines have tap roots going down to a considerable depth.

Forest Planting at Bogalusa

By Philip C. Wakeley, United States Forest Service

Since the winter of 1920–21 the Great Southern Lumber Co. has planted approximately 16,000 acres of pine in the immediate vicinity of Bogalusa, La. Longleaf and slash are the predominating species. The company's nursery at present contains more than 11,000,000 longleaf seedlings, from seed sown early in March. Enough of these should survive to plant about 10,000 acres next fall, at the rate of 900 trees to the acre.

Slash and loblolly pines planted by the company in 1920–21, 1921–22, and 1922–23 are now 6 to 12 feet high. Longleaf planted as year-old stock in 1923–24 is 3 or 4 feet high—in marked contrast to naturally seeded longleaf of the same age, which is barely commencing height growth.

Survivals have been high. Fires have been kept out of all but a minute fraction of the area, and almost none of the plantations have dropped below 60 per cent survival. Despite damage by rabbits, tip moths, defoliating beetles, and the brown spot needle disease, most of the plantations run between 75 and 85 per cent survival. One sizable area of longleaf shows a survival of nearly 90 per cent.

The company usually collects its own seed. Ten-month-old seedlings are large enough for field planting, and the expensive process of transplanting in the nursery is done away with. Field planting is done by two-man crews, with dibbles, in plowed furrows, and the cost seldom runs as high as $5 an acre.

The European Larch Canker

By Perley Spaulding, Bureau of Plant Industry

Early in 1927 the European larch canker was found in eastern Massachusetts, particularly in the towns of Hamilton and Ipswich. Here the disease was present on European larch imported about 20 years ago from Scotland. In areas where the disease was prevalent nearly all the trees were found to be infected. In the vicinity of the worst infections of the larch the Douglas fir, also, was found to be heavily infected, the cankers resembling those of the larch. This attack makes the disease a dangerous threat to the Douglas fir of the Northwest, since an unbroken belt of tamarack reaches across Canada into the native range of Douglas fir on the Pacific coast.

In stands of the native larch in the Northeast there is found a fungus which closely resembles the foreign parasitic canker but which is saprophytic in action. Whether the two belong to the same species is as yet unknown. Both fungi have tiny, cup-shaped, white bodies with short stems, the inside of the cup being a bright yellow or orange color. When the cup is dry, its edges roll inward and the diameter of the whole fruiting body is much reduced. When it is wet, the edges unroll and the cup becomes saucer shaped and much larger in diameter. The best time to look for the fungus, therefore, is in wet weather or just after a rain. The first place to look for the fruiting body is on dead twigs. Fungi of suspicious appearance should be sent for identification to the office of forest pathology, Bureau of Plant Industry, Washington, D. C.

Chemicals Used to Eradicate Ribes

For four seasons the office of blister rust control, Bureau of Plant Industry, has been experimenting in northern Idaho to determine the feasibility of eradicating Ribes by means of chemicals. For spraying the chemical upon the bushes a lightweight forest fire pump has been modified to give spray pressures of 250 to 300 pounds. The first trials, which were on a small scale, resulted so successfully that the scope of the experiments has been much enlarged. The work has shown that *Ribes petiolare* Dougl. can be eradicated by chemicals much more easily and cheaply than by hand pulling. Since this species is very susceptible to the blister rust and is one of the three species that frequently occur in great numbers in stream bottoms of the western white pine type, where the costs of hand work are high, this marks an important step forward in the control of the disease.

The most effective substance yet found is sodium chlorate ($NaClO_3$), which is marketed under the trade name of Atlas N. P. Weedkiller. This chemical consistently kills 96 per cent of *Ribes petiolare*, but shows a kill of 51 per cent only on *Ribes lacustre* and a 39 per cent kill on *Grossularia inermis*. Other chemicals being tried on the two latter species are compounds of halogen and oxyhalogen.

Chemical killing as now developed costs from 35 to 50 per cent less than hand grubbing; and experimental work now under way indicates that a still greater saving can be expected.

The Bronze Birch Borer

By Ralph C. Hall, Michigan School of Forestry and Conservation

The bronze birch borer (*Agrilus anxius Gory*) has long been recognized as a serious pest to shade and ornamental trees, but only within comparatively recent years has it been regarded as a serious menace in the forest. In Cornell University Bulletin 234, published in 1906, Slingerland states (page 73): "There is no record of any kinds of birches having been killed by the insect in forests or woodlands." To-day the situation is entirely different; borer attack in the forest is very common wherever there are birches. The bronze birch borer follows closely the distribution of its host, the birches, and confines its attack almost entirely to this genus.

Slow development of the leaves in the top of the tree in the spring is an evidence of infestation. The leaves on the lower part of the crown may be fully developed while those in the top are barely starting or only partially developed. Such a condition is very noticeable in late May or early June. Another evidence of infestation is a stag-headed effect. The top part of the tree may be dead or dying and the lower part may be still green and apparently thrifty. The borer may cause discoloration of the bark over the pupal chambers or larval tunnels. This is the least reliable evidence of attack and is useful only for the white birch group. Welts or ridges may form on the bark over the larval tunnels. These welts usually take the form of spiral rings around the stem and are caused by an attempt of the cambium to grow over the larval tunnels. They are especially common when the attack is light. When the infestation is heavy, many trees may show no welts on the bark.

The most serious economic damage to birch is confined to second-growth forests of mixed hardwoods or mixed hardwoods and conifers in which changes from the natural condition have been brought about by some outside agency such as man or insects. Borer injury is especially serious following logging in which the stand is cut to a diameter limit or in which the softwoods are removed and the hardwoods left. It is also serious following an attack by the spruce budworm. In all these instances the natural condition of the stand has been changed in proportion to the severity of cutting or the seriousness of budworm attack. In all cases the stand has been thinned. Since the bronze birch borer is a light-loving insect, this thinning makes conditions more favorable for its attack. Probably the physical factors of the environment have also been changed to a rather marked degree. During the period of readjustment to their new environment following such changes, the birches are probably more susceptible to attack by the borer than they would be under normal conditions. A specific example of serious borer damage following logging is found on the Cherry Mountain sale area of the White Mountain National Forest in New Hampshire, where the general method of cutting is to a diameter limit of 6 inches in softwoods and 10 inches in hardwoods. Results on a permanent sample plot located on that area during the field season of 1927 show how serious this insect may become in a short period of four years. On this half-acre plot are 45 yellow birches, ranging from 1 to 10 inches diameter breast high, with an average of 5.5 inches. In June, 1927, 38 trees were infested or killed by the borer. This amounted to an infestation of 82 per cent by numbers or 81 per cent by basal area. There seems to be no indication that the borer will cease operations in this stand at an early date, so we may logically expect the degree of infestation to increase for the next few years or until all the birches on the area are destroyed.

Among those who have started work on the problem of bronze birch borer damage are: H. B. Pierson, State entomologist of Maine, whose findings appear in the January, 1927, issue of the Journal of Forestry; Dr. S. A. Graham, agent for the Bureau of Entomology, Lake States Forest Experiment Station, who has established a number of permanent sample plots in the Lake States for the purpose of studying borer damage; and Dr. J. M. Swaine, chief of the division of forest insects, Entomological Branch of Canada. The Bureau of Entomology, cooperating with the United States Forest Service at the Northeastern Forest Experiment Station at Amherst, Mass., started work in New England during the field season of 1927, permanent sample plots on the Cherry Mountain sale area being established by the writer under the guidance of H. J. MacAloney, agent for the Bureau of Entomology. A study to be made by the writer in the Lake States during the field seasons of 1928 and 1929, under the direction of Dr. S. A. Graham, is being financed from the faculty research fund of the University of Michigan. The work of the 1928 field season will consist, chiefly, in an extensive survey of the borer damage in the Lake States with an attempt to ascertain the amount of damage in the different crown classes in stands varying in density, age, soil conditions, exposure, topography, and geographical distribution under various systems of cutting and budworm injury. Practically nothing is known concerning the effect of the borer in selective logging practice, and it seems essential to have facts on this matter before a wholesale policy of selective logging is adopted in stands containing birch as an important species in the mixture.

The Influence of Forests on Rainfall and Run-off

By C. E. P. Brooks, Clark University

[From Meteorological Magazine, December, 1927]

Of the water vapor which is condensed as rainfall over the land, about two-thirds is provided by evaporation over the oceans and the remaining third by evaporation and transpiration over the land. The latter contribution is made up of the evaporation of rainfall intercepted by foliage, evaporation from the soil, and transpiration; and estimates are made of these three factors for forests, crop or grass land, and bare soil. The figures are expressed as percentages of an average rainfall of 30 inches a year. For forests they give interception, 15; evaporation from soil, 7; transpiration, 25; total, 47 per cent; for crops, evaporation from soil, 17; transpiration, 37; total, 54 per cent; for bare soil, evaporation, 30 per cent. Thus, the replacement of forests by crops would tend to increase the supply of moisture to the air, and, therefore, the general rainfall; replacement by bare soil would slightly decrease the general rainfall. The changes in the run-off are likely to be more noticeable; replacement of forests by crops would decrease the run-off by 15 per cent and make it less regular; replacement by bare soil would increase the run-off, but would make it highly irregular. A forest 30 feet high may be considered as adding about 30 feet to the effective height of the ground, and this should increase the local orographical rainfall by 1 or 2 per cent.

Data obtained in various localities were examined in detail. At Mauritius, deforestation has resulted in a decrease by 2 or 3 per cent, while in Sweden, Germany, and India the rainfall at forest stations is about 1 per cent greater than that at neighboring stations in the open, allowance being made for differences of exposure. The question of fog and dew was also examined, and it was found that under average conditions their total effect is slight.

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Results with deferred and rotation grazing in the Flint Hills of Kansas and on mixed prairie and short-grass country near Mandan, N. Dak., are discussed in an article in the Cattleman by A. E. Aldous, professor of range management at the Kansas Agricultural College. In a trial in Kansas, 640 acres of pasture on which grazing was season long supported an average of 103 head of cattle for 6 months each year over a period of 8 years. Under the deferred and rotation system, 640 acres carried stock at the rate of 175 head of cattle for a 6-months season, thus giving 70 per cent greater returns than the season-long pasture. At Mandan it was found that 4 or 5 acres grazed under the deferred and rotation system could carry as much stock as 7 acres grazed season long, thus showing an advantage of approximately 56 per cent.

Clearing the Way for the Smoky Mountain National Park

By VERNE RHOADES, executive secretary, North Carolina Park Commission

Now that the necessary funds have been made available through a gift from the Laura Spelman Rockefeller Foundation and appropriations by the governments of North Carolina and Tennessee, plans are actively going forward toward the establishment of the Great Smoky Mountains National Park. As now planned, the park will comprise 428,000 acres of land in Tennessee and North Carolina. In North Carolina field crews are engaged in estimating the stand on the area chosen for purchase. On the larger holdings a 10 per cent estimate of the timber is being made and on the smaller tracts a 50 to 100 per cent estimate. It is expected that this cruise will be finished by October 1 of this year. The cost of the cruise runs about 18 to 20 cents an acre, which, though high, is cheap when the density of the laurel among the spruce is considered. More often than not, a mile of strip is a hard day's work for a crew. The survey of property lines costs about $35 a mile.

Of the 214,000 acres proposed for purchase in Tennessee, 150,000 acres is in five holdings and the remainder is in the hands of some 1,000 owners. In North Carolina, 175,000 acres is in eight holdings ranging from 5,000 to 53,000 acres; the balance is in small tracts numbering somewhere around 300.

The appraisal of land and timber values alone is not such a difficult task, but in the present case the value of improvements and operating businesses must also be taken into account. There are three band mills operating on the tract, the large pulp mill of the Champion Fibre Co. gets its spruce from the area, and some 85 miles of logging railroad, many logging locomotives, and logging equipment of all kinds are involved. Under these circumstances the appraisal of damages will be a difficult task.

It seems probable that at least two full years more will be required to complete the work that must be done before title can be transferred to the Federal Government.

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The Booth-Kelly Lumber Co., of Eugene, Oreg., has completed an experimental planting of more than 10,000 pine and redwood seedlings. The seedlings were supplied by the nursery maintained cooperatively by the State forest school at Corvallis and the Federal Government, under the Clarke-McNary law. The planting was directed by Norman G. Jacobson, of the Western Forestry and Conservation Association. It is in supplement to the company's policy of providing for natural reproduction of the original species by leaving seed trees and by effective handling of slash disposal.

Fire Protection Rules for Railroad Right of Way

An endeavor to obtain more efficient action by section crews, train crews, and other employees in preventing, suppressing, and reporting fires along the right of way is being made by the Atlantic Coast Line Railroad. In a recent circular detailed instructio[illegible] were issued to all employees with this object in vie[illegible] Front-end arrangement and ash pans of locomotives are to be inspected at the end of each trip. Locomotives are not to be returned to service with any holes in plates or netting larger than the original open areas of the netting. Sprinklers are to be used liberally before ash pans are dumped in order to be sure that live coals are not left on the track. Proper precautions are to be taken to see that ash pans are closed and secured so that fire will not drop through. Burning waste from hot boxes must be extinguished by trainmen. The right of way is to be burned promptly as soon as weather conditions permit after the first frost, low places that fail to burn the first time being carefully watched and burned again as soon as they are dry enough. Old logs and stumps that catch fire in the burning of right of way must be extinguished at the end of the workday. The area burned at one time must be small enough so that the fire can be kept under control in the event of a sudden change in wind direction. When old crossties are being burned during dry weather some one must stay with the fire until it is out or must put it out at the close of the workday before leaving. Section masters are ordered to proceed to fires started by accident as quickly as possible with sufficient men to control them. Placards are to [illegible] kept posted in smoking compartments of coach[illegible] calling attention to the danger of throwing lighted matches, cigars, and cigarettes from windows. Reports must be sent in by wire by section masters in regard to all fires discovered on or near the right of way, so that a quick investigation can be made and responsibility for the fire determined.

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The St. Paul & Tacoma Lumber Co., founded June 4, 1888, has marked its fortieth birthday by announcing the adoption of plans for keeping its forest lands continuously productive. A survey of the cut-over lands belonging to the company has been made by the forest research and management department of the Western Forestry and Conservation Association.

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J. A. Waters, of Twin Falls, Idaho, set out a woodland of black locusts in 1905 and began cutting fence posts from it in 1911. These first posts, and a wagon tongue cut at the same time, after more than 16 years' service are still in excellent condition. The woodland, besides furnishing durable farm equipment at practically no cost, is in frequent use as a picnic ground.

Dry and Wet Thunderstorms Alike

So-called dry lightning, or the dry thunderstorm, is due to the same causes and occurs in the same manner as any other thunderstorm, E. B. Calvert, of the Weather Bureau, explains. A thunderstorm is caused by a violent vertical convection of air that contains nough moisture to be condensed into an abundance of ndrops. All thunderstorms are equally wet in and just beneath the cumulo-nimbus clouds where the raindrops form. Under conditions in which the lower air is even moderately humid, the rain forms at such low levels that only a part of the condensed moisture evaporates as it falls toward the earth. On the other hand, in regions where the lower air is extremely dry the water vapor condenses, or the rain forms, so high up that all or nearly all of it evaporates in mid-air as it falls, and the thunderstorm is a dry one. With no accompanying moisture reaching the ground to wet the burning material, forest fires set by such storms spread rapidly, and are very difficult to extinguish. Dry air and high temperatures favor the spread of such fires.

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Many who are familiar with the native American larches (Larix) will be surprised to know of a genus closely resembling the true larch and represented at the present time by but one known species. This species is Pseudolarix amabalis, the golden larch. The tree differs from the real Larix in the stalked, pendulous, clustered, staminate flowers and in the deciduous ne scales which separate from the central axis at aturity as in the fir. The lone species comes from a restricted region in eastern China, where it grows in the mountains at an altitude of from 3,000 to 4,000 feet. This tree, which in its native haunts attains a height of 150 feet, is well adapted for ornamental purposes in the United States, since it has a broad pyramidal habit with light green feathery foliage. The needles turn a golden yellow in the fall.

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The type of forest growth formerly borne by an area furnishes an indication of the area's probable susceptibility to corn-borer infestation, according to the results of studies by Prof. E. N. Transeau and Prof. H. C. Sampson, of the Ohio State University. Data collected in Ohio and Ontario showed that the most serious borer infestation occurred in parts that were once covered by swamps and swamp forests. Fields of corn growing on the sites of former beech forests were infested less severely, and the lowest degree of infestation was shown by areas once covered with oak-hickory timber. Professor Transeau points out that the beech forests grew on relatively moist lands, whereas the oak-hickory forests developed on land of a drier type.

Apache Pine Appears Fire Resistant

In 1925 an unusually hot fire burned more than a thousand acres in the Chiricahuas of Arizona. A visit to the area in November, 1927, disclosed sprouts from completely consumed silver leaf oaks, dead and badly injured western yellow pine—and Apache pine of all ages and sizes to all appearance unharmed. Apache pine seedlings which must have been right down in the bunch grass at the time of the fire show no signs of injury and have made normal height growth since. Large trees have charred bark but no fire scars or other signs of injury. (Growth was not measured.) Mature Apache pines show no injury where similar neighboring western yellows are "bleeding" and unsightly. Apache pine (or Arizona longleaf) is similar to southern longleaf, which is noted among all pines for its resistance to fire. Apparently it is a worthy relative. The long, coarse needles of the seedling burn and char, but protect the terminal bud in their midst. In addition, either the bark is exceedingly insulating or the cambium layer is wonderfully fire resistant.

Relation of Forest Types to Farm Fertility

A close correlation of agricultural development with certain soil types that were reflected in the natural vegetation has been disclosed by an ecological study of Pennsylvania, reported in the Bulletin of the Geographical Society of Philadelphia. Thus the white oak-hickory belt is also the region of the better agricultural areas; the white pine-hemlock forest type occupies land that makes poor farms; the spruce-fir type occupies regions of little agricultural value; and the northern hardwood forest of beech-birch-maple coincides with the dairy farm lands.

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A new forest industry has made its appearance in Clay County, Ala.—the manufacture of baskets, vases, trays, and flower pots from the needles and cones of longleaf pine. About a year ago Mrs. J. E. S. Rudd, home demonstration agent, began teaching this craft to women of the county. The product of the first month's work sold for $835, and a year later the sales amounted to $2,400 in a month.

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A plan to trade-mark lumber produced in the mills of the Western Pine Association was adopted at the association's twenty-second annual meeting, in Spokane, February 7 and 8. It was decided to use for this purpose a printing machine invented by D. R. Tanner, superintendent of the Bowman-Hicks Lumber Co., La Grande, Oreg. The marking machines will be installed behind the planers and will print the name of the species, the company trade-mark, the number of the mill, and the name of the association on the lumber as it passes through.

Treated Ties Save Money

Every treated main-track tie put into use in 1910 by the Delaware, Lackawanna & Western Railroad will by 1930 have saved the company 93 cents, according to estimates of G. J. Ray, the road's chief engineer. On the basis of present-day costs the company expects within 20 years to save $1.26 apiece on treated ties placed in track to-day. On southern lines, where the life of an untreated tie is much shorter than in the north, savings through preservative treatment are expected to amount to $3.26 per tie in 18 years.

Agricultural Cooperation for Pan America

A division of agricultural cooperation has been established in the Pan American Union. The division will work to advance cooperation and research in agriculture, animal husbandry, and forestry in the member countries of the Union, thus carrying out resolutions adopted by the Sixth International Conference of American States held in Habana in January and February, 1928. It will facilitate the exchange of seeds and plants among these countries, and will study the needs of the different nations for introduction and propagation of new varieties of seeds and plants and for the development of new agricultural industries. It will endeavor to increase the use of Latin America's forest resources by bringing about timber surveys and tests of woods for industrial uses, and by promoting the study of reforestation and the relation of forests to water supplies and irrigation.

The division will be under the immediate direction of Señor Alberto Adriani, of Venezuela. Dr. W. A. Orton, director of the Tropical Plant Research Foundation, will take part in its direction in the capacity of technical adviser to the Pan American Union.

Wood Silos Give Satisfaction

Of the 34 users of creosoted wood silos who replied to a questionnaire recently sent out by the Forest Products Laboratory, the majority reported that their silos were giving satisfaction. The silos covered by the reports had been treated with creosote by the pressure, hot and cold bath, and dipping treatments, and had been in service for from 9 to 15 years. In no case was any decay reported. Three correspondents reported that when new their silos slightly contaminated the silage.

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The southeastern section of the Society of American Foresters was organized at a meeting in Jacksonville, Fla., on April 3 that was attended by about 25 foresters. Lenthall Wyman was chosen chairman, I. F. Eldredge vice chairman, and S. J. Hall secretary-treasurer. The territory of the section includes Florida, Georgia, Alabama, and the coastal part of South Carolina.

Foreign Notes

The "Remarkable" Pine

By E. N. Munns, United States Forest Service

Of all tree species the one best known to-day outside of its native country is perhaps the Monterey pine. This is due to the widespread popularity which the tree has gained within the space of a few years in the antipodes, through a growth rate that promises rapid development of merchantable stands of timber. In most parts of Australia and New Zealand the tree is known as "the remarkable pine," a name which its growth justifies.

In South Australia the tree has been used in reforestation work for more than 40 years, and over a somewhat shorter period it has been extensively planted also in Victoria and New South Wales. Stands have yielded over 250 cubic feet per acre per year, and a stand of 33 years cut 100,000 superficial feet per acre. (This included material down to 3 inches.)

Just when the Monterey pine was first introduced into New Zealand is not known, but existing plantations are known to be between 40 and 45 years old. The growth rate is much the same as in Australia, the annual increment (inside bark) being 250 cubic feet per acre at 30 years and 385 cubic feet at 40.

The tree was first introduced into South Africa about 1875, but plantations were not made there until 1884, when 20 pounds of seed were imported. The growth as elsewhere is exceedingly rapid, with annual increments between 250 and 300 cubic feet per acre. One plantation of 163.4 acres at Tokai was cut in 1918 when 32 to 35 years old. From this area 734,450 cubic feet of Monterey pine was removed, besides 207,750 cubic feet of eucalypts. On the average acre the pine cut amounted to about 290 cubic feet, yielding a gross return of $1,950. The highest stocked acre yielded nearly $5,000. These prices were much heightened by a temporary shortage of timber. The largest tree at 35 years was 136 feet tall, with a diameter of 38.2 inches and a volume inside bark of 315 cubic feet.

Just what factors are responsible for this tremendous growth is not known. Apparently even in the antipodes growth is not always so rapid, for several bitter disappointments have resulted from planting in regions that differ but little from those where the tree is such a success. In South Africa the tree does better on the slopes than on the bottom lands, and at higher elevations than lower, while in Australia the reverse is true. Poorly drained soils, lime soils, or shallow soils limit the growth markedly. But little has been learned definitely of climatic influences, because of the lack of data

So far these overseas plantations of "the remarkable pine" are free from disease and insect pests. It is earnestly hoped that these planted forests, now being rapidly extended, will not experience the serious troubles which pure even-aged stands over considerable areas usually invite.

Floods Follow Hungary's Loss of River and Watershed Control

Before the World War, Hungary was one of the most compact countries of Europe, being a large central valley rimmed in by high forested mountains and traversed by a master river. Old Hungary was a first-class forest nation with some 20,000,000 acres, 26 per cent of its total area, forested; about 5,000,000 acres were oak, about 8,000,000 beech, 5,000,000 pine, and 2,000,000 other woods, among which spruce was prominent. Some 16 per cent of this forest area belonged to the State; and 50 per cent more, although in private ownership, was under State control, largely because of the influence of the forests upon water supplies, floods, or erosion. Up to the time of the war about 25,000 acres of privately owned oak and beech forests at the lower elevations were being cleared annually for agriculture, while between 5,000 and 10,000 acres of new forest was being planted each year. All the planting was reclamation work for the control of erosion or floods, done either by the State or by the owner under State direction; for the State had many years ago (about 1850) recognized the importance of forests.

Postwar Hungary consists of only a portion of the original valley, without natural geographic boundaries. Her forest resources are greatly shrunken, since most of [illegible] eastern mountains have been lost to Rumania, all her northern mountains to Czechoslovakia, her eastern highlands to Austria, and her southern hills to Yugoslavia. There remains only 14.3 per cent of the original forest land, consisting of 32.2 per cent of the original oak, 13.7 per cent of the beech, and 2.6 per cent of the pine lands. The extensive plantations of acacias in the dune region still remain in Hungary, but the plantations of pine, spruce, and hardwoods for erosion and flood control were lost.

Under the old order, wood, both saw timber and pulp, formed a large percentage of Hungarian exports, and the nation was independent of other countries for timber. Now Hungary is dependent upon the counties that were taken from her. While nearly a third of her oak forest remains, this is mostly an inferior forest much like the oak fringe forest of Missouri, Oklahoma, and Texas, valuable chiefly for firewood.

The loss of the mountain forests has had another result. In the past century some 4,000 miles of levees have been built along the Danube and Tisza Rivers, as along the Mississippi, to protect some 15,000,000 acres of agricultural land. These levees have been augmented in the lower river by other protection devices such as spillways and detention basins and in the mountains by extensive flood-control works—check dams, terraces, and contouring. Before the war, as a part of the flood-control work, more than 800 rain gauges were in use in the mountains, with 1,700 gauging stations along the streams. These were all linked together with a network of telephones for controlling the disposition of the flood waters in the lower stretches of the rivers. The revision of the national boundaries, however, has placed the headwaters of the streams, and thus all knowledge of storms and of run-off, in the control of other nations. With the partition of Hungary all governmental control of private lands was removed. Lumbering à la carte has taken place, destroying the protective cover. The erosion and flood-control works have deteriorated through lack of maintenance. Overgrazing in mountain forests and meadows, also, now contributes greatly to erosion.

All this does not add to the good will of nations or to the happiness of Hungarian farmers, for since control of the forest has been lost and forest abuses have begun, floods have almost annually destroyed levees and crops, and erosion deposits in the rivers are steadily raising the stream beds. Lack of knowledge of the size of floods and so of information as to how best to handle them, and the increasing ineffectiveness of the "levees only" system were responsible for the severe floods of the spring of 1927, on the Danube and Tisza Rivers. These floods in Hungary, though overshadowed in importance by our own Mississippi River situation, cost many lives and resulted in much property damage.

Upon the representation of the Hungarian delegates, who visualized the situation as it has developed, the Geneva Peace Conference appointed an international commission to study the forest and water relationship in central Europe, and gave this body powers to establish certain restrictions upon land use as it affected Hungary. As yet the commission has not developed any enforceable rules except some providing for forest fire protection. It is to be hoped that in time this commission will be able to work out some means of correcting the situation. In the meantime, Hungary suffers from an enforced policy of "levees only."

Mycorrhiza Helps in Establishing Spruce

In the forest of Namdal in northern Norway, natural regeneration of spruce has been obtained with difficulty because of the luxuriant vegetation of herbs and ferns. Under a dense crown cover, it has been found possible to get the seedlings established upon decaying wood such as windfalls, stumps, and branch wood. Studies by Dr. Elias Mork indicate that all these young trees develop typical mycorrhiza even in the first summer. This is believed to be due in part at least to the acidity of the decaying wood, which is greater than that of raw humus soil. Mycorrhiza seem to be able to transform highly acid compounds into more simplified ones capable of direct assimilation by the plant.

Blister Rust Control Work in Europe Suggested

The *Pinus strobus*, for whose protection from blister rust myriads of currant and gooseberry plants have been destroyed in its native United States, has not enjoyed the tribute of similar sacrifices in Europe—even in the countries where it has shown great value. In the words of a writer in the Quarterly Journal of Forestry, "western Europe may be sorry for the Weymouth pine, but it is not inclined to give up the black currant."

This pine, known in America as the northern white pine and in Europe as the Weymouth pine, when introduced many years ago into central Europe found the climate favorable and demonstrated its value for both timber-producing and silvicultural purposes. Among the few available species of conifers spruce had been chosen by the foresters of Europe as the general utility tree and was by far the most widely planted. The widespread cultivation of spruce had proved by no means an unmixed blessing, being followed in many cases by the development of bad soil conditions. Consequently the *Pinus strobus* was most welcome, and planting it became the fashion. The tree had to be protected against deer, and it suffered early losses from damage by *Armillaria mellea*, the honey fungus. Where rightly treated, however, it more than proved its worth, and it came to be regarded as one of the established forest trees of Europe. It was frost-hardy. It was desirable for afforestation, for reforestation of deteriorated land—especially on heaths, where it suppressed the weeds and brought the soil into better condition—and for mixing with spruce in places where raw humus had accumulated and heath tended to invade the forest. Apart from these rather special uses, the best general manner of cultivation proved to be in larger or smaller groups in mixed hardwood-conifer forest—i. e., in surroundings similar to those among which the tree grows in the Allegheny Mountains in its native country.

Twenty-seven years ago Doctor von Tubeuf, of Germany, prophesied that stringent measures would have to be adopted if the *Pinus strobus* was to be saved from the blister rust. No such measures having yet been taken, within the past year Doctor von Tubeuf has come forward with recommendations for measures to save the species. In order to exterminate the white pine blister rust within a short period he suggests that a special commission be empowered to prohibit the production and sale of susceptible five-needled pines and susceptible species and races of currants and gooseberries; that all rust-infected pines or parts of pines be ordered destroyed and all susceptible currants or gooseberries removed; that the *Pinus peuce*, the five-needled pine native to the mountains of the Balkan Peninsula, which is not quite so quick a timber producer as the *Pinus strobus* but is immune to the blight, be substituted for the latter where suitable; and that the immune Dutch variety of red currant be cultivated in place of currants susceptible to rust. If alleviative measures only are desired, he suggests that nurseries be forbidden to cultivate and trade in susceptible five-needled pines or susceptible currants and gooseberries; and that owners of forests, parks, gardens, or pleasure grounds be required to remove all diseased *Pinus strobus* and Ribes, and in replacing them to use immune sorts, regeneration of the *Pinus strobus* being permitted where the pine is free from rust.

As an additional means of preventing the extermination of *Pinus strobus* in Europe by the blister rust Doctor von Tubeuf recommends the spreading of Tuberculina maxima, the small fungal parasite living on the aecidial stage of the white pine and other similar blister rusts. Recognizing the difficulty of carrying out even the less extreme of his suggestions in the present state of public opinion, he proposes that at least the *Pinus peuce* be cultivated for the present as a substitute for the *Pinus strobus.*

New Forest Machinery and Methods Developed in Germany

The machinery committee of the German Forestry Society, headed by Doctor von Monroy, reports the recent development of a tractor engine sufficiently mobile to be used for cultivation work in forests. This engine, of about 20 horsepower, has a length of 1.75 meters, a width of only 80 centimeters, and a ground clearance of about 30 centimeters. It may be used not only for cultivation but also to transport wood.

As a means of ground cultivation in the forests of Germany, Doctor von Monroy writes, implements resembling a plow have hitherto been used but are found unsatisfactory because of obstacles met with in the forest floor. There is now coming into use a ground cutter having quills which revolve rapidly around an axis. Such a machine may be used with either a small motor of 5 horsepower or a tractor such as that just described.

In the "Cobra" method the Germans have found a way to give preservative treatment to telephone poles or railway ties already in use. By means of a small stabbing apparatus a decay-preventive paste is injected into the wood, especially in parts near surfaces that are in contact with the ground. When moisture is absorbed by the wood the paste is distributed evenly through these parts.

An innovation in sawing work is an apparatus consisting of a lamp fitted with an arrangement of wires so that it throws a sharply defined light ray upon the wood to be cut, either lengthwise or crosswise. This, says Doctor von Monroy, makes possible a much better utilization of wood than has yet been obtained by measuring with the eye.

Form Factor for Norway Spruce

Tree-form studies by Erling Eide of the Institute of Experimental Forestry in Norway show that the form factor for every normal type of Norway spruce stand depends solely upon the relation between height and diameter at breast height. This relation is a simple and may be expressed in the following equation:

$$f=0.65-\frac{0.16d-0.40}{h}$$

in which *h* is height in meters and *d* the diameter inside bark at breast height in centimeters. Data for this work were selected from a wide range of sample plots of the institute and included a wide variation in age, soils, density, and climatic conditions.

The results of the investigations show that the form factor increases with increasing height and decreases with increasing diameter; that the form factor is not influenced by age; that density of stand and climate (latitude) influence the form factor only in the same degree as they influence the relation between height and diameter; that the form factor follows the same equation in both even and uneven aged stands; and that the quality of the soil does not influence the form factor if it does not prevent a natural development of the tree. If the orm factor is higher on poor than onf ood soil, it appears to indicate too close spacing ing lation to conditions of fertility.

Mysterious Tree Deaths Attributed to Electricity

In the forest of Cudrex, Fribourg, Switzerland, 204 spruce trees on an area of 25.5 ares were killed last fall in a somewhat mysterious manner, according to a report by P. de Gendre published in the Swiss Journal of Forestry.

It was noticed that a number of spruces had dead crowns. The cause was not apparent, and the trees were felled for examination. While the felling was being done additional trees became dried out in the crowns. Sometimes the top of the tree was dead and the lower branches green, sometimes the branches in the middle of the crown began to dry out while the top remained green; in the end, however, every tree attacked dried out to the top. Four times additional fellings had to be made because new trees were affected. Examination of the felled trees showed that some trees were dry and dead for the whole length, some for a distance of 3 to 4 meters from the top down. Often a flow of resin was found on the trunk at the lower edge of the crown or within the lower crown. On removing the bark it was found that the cambium was dead, sometimes for the full length of the tree, sometimes only part way, and that it was attached to the wood by long blackish violet filaments. On cut surfaces the wood was whitish, lightly tinted with yellow. The roots appeared absolutely healthy. The few hardwoods on the area had not been affected.

After the extraordinarily rainy summer of 1927 there could be no suspicion that this effect was traceable to a lack of moisture in the air or in the soil. Trees bearing a trace of insect attack or of fungus were the exception. There was none of the commonly recognized indications that lightning had struck near by. But on the basis of 35 years' observation and of records of similar phenomena observed in coniferous forests by the German foresters Hartig, Hess-Beck, and Von Tubeuf, M. de Gendre has concluded that the trees were killed by electricity. He suggests that losses of this sort due to electricity are sometimes erroneously attributed to insects.

Sterilizing Lumber Infested by Powder Post Beetles

A method of destroying powder post beetles in seasoned timber has been worked out by the Forest Products Research Laboratory, Princes Risborough, Bucks, England. Three species of these beetles are introduced into England in low-grade American oak and ash lumber. They attack the "sapwood of oak, ash, walnut, chestnut, hickory, and other large-pored timbers," partly or fully seasoned. Their activities are especially troublesome to furniture manufacturers, who are unaware of their presence in lumber used for the manufacture of furniture until the furniture is returned on account of "wormholes" that have appeared after sale. The method of sterilizing the lumber is to treat it in a kiln for one and one-half to two hours at a temperature of 130° F. with the atmosphere of the kiln at saturation point. The wood is brought to the required temperature at the beginning of the period of treatment. The time required for the heat to penetrate to the center of the pieces varies with thickness, and it is suggested that a good general rule is to allow one hour per inch of thickness for the preliminary treating. No damage is done to the wood.

The laboratory is now carrying on a study to ascertain a method of impregnating the sterilized timber to prevent future infestation.

Government Reforestation Work in France

Between 1900 and 1927 the French Government reforested about 86,000 hectares of Government land, and by means of subventions procured the reforestation of about 50,000 hectares each of private and communal land. During the same period the Government acquired 317,822 hectares of land, bringing the total of State forests up to 1,466,240 hectares.

Mexican Longleaf Does Well in South Africa

Pinus patula, the Mexican longleaf pine, was first introduced into South Africa as an ornamental tree, about 1907. Between 1910 and 1913 sufficient seed to form plantations became available, and several plantations were started. The importing of seed from Mexico was interrupted by the Mexican revolutions of 1913, but the planted trees soon began to produce seed in abundance. At 12 years the trees average from 4 to 7 inches in diameter and from 40 to 60 feet in height. These stands have an exceedingly high volume, the current annual increment ranging from 300 to 634 cubic feet per acre. The tree appears to stand snow and frost without injury. Plantations are most successful in those parts of the country where the annual rainfall, most of which comes during the summer months, is around 30 inches.

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French naval stores producers are congratulat[illegible] themselves on having succeeded in getting resin recognized as a suitable ingredient in soap. A measure recently passed by the Chamber of Deputies permits its use, although specifying that soap in which resinous products compose more than 5 per cent, by weight, of the fats, can not be sold as "pure."

Personals

Will C. Barnes has retired as chief of the branch of range management, United States Forest Service, and on July 1 becomes secretary of the United States Geographic Board. The work which thus becomes Mr. Barnes's major activity is one in which he is intensely interested and in which he has had an official part since 1920, when President Wilson made him a member of the board. Mr. Barnes got his start as a geographer when as a boy enlisted in the Signal Corps he helped to build the first long-distance telephone line in the world, connecting Coast Guard stations along the coast of Virginia. Next he learned the geography of the Southwest as a military telegrapher at Fort Apache, Ariz. It was there that by a night ride through the Indian lines Barnes saved the lives of a garrison and earned the congressional medal of honor. Soldiering led to ranching, and for 25 years Barnes was a cattleman of Arizona and New Mexico. During that period he served in the legislature of each of the two Territories. In 1907 he joined the Forest Service, as an inspector of grazing stationed at Albuquerque, N. Mex. In 1915 he was called to Washington to take charge of the regulation of grazing on the national forests.

Mr. Barnes's distinguished gift for writing has made his name familiar to the magazine-reading public, and he is well known also as a lecturer. In the summer of 1926, backed by an act of Congress and a special appropriation, he scoured the Southwest for specimens of the old breed of longhorn cattle and established a small herd, safe from extinction, on the Wichita National Forest, Okla.

C. E. Rachford, assistant chief of the branch of range management since 1924, is Mr. Barnes's successor. Mr. Rachford joined the Forest Service in 1905, as guard on the present Modoc National Forest. He served as supervisor of the Modoc and Santa Barbara National Forests, and from 1915 to 1920 was assistant district forester in charge of the regulation of grazing on the national forests of California. In the years 1920–1924 Mr. Rachford performed the enormous task of appraising all the grazing lands on the national forests, his appraisal becoming the basis of grazing fees now in force.

Aldo Leopold has resigned as associate director of t[illegible] Forest Products Laboratory to engage in private work as consulting forester specializing in game management. Mr. Leopold has been a member of the United States Forest Service since 1908, the year of his graduation from the Yale Forest School. Serving first as a forest assistant on the Apache National Forest, Ariz., he became forest supervisor of the Carson National Forest, N. Mex., and then, in 1919, assistant district forester in charge of fire control and field personnel in the Southwestern National Forest District. He became associate director of the Forest Products Laboratory in 1924. He has served on the executive council of the Society of American Foresters and on the board of directors of the Wisconsin Division of the Izaak Walton League.

Mr. Leopold's first undertaking in his new status is a survey of American game resources for the Sporting Arms and Ammunition Manufacturers' Institute. He will continue to make his headquarters at Madison, Wis.

Lewis E. Staley has accepted appointment as the first State forester of South Carolina. Mr. Staley was for 21 years identified with the State forestry work of Pennsylvania. He was a member of the first class graduated from the Mont Alto Forest Academy, now the Pennsylvania State Forest School. For a number of years he had charge of the Mont Alto State Forest. e assisted Gifford Pinchot in planning the reorganization of the State department of forestry, and during Mr. Pinchot's governership served as deputy under R. Y. Stuart, secretary of the department of forests and waters. This position of deputy secretary of the department of forests and waters in Pennsylvania corresponds to the position of State forester in other States.

George C. Pardee, former governor of California, has been appointed to head the California State Board of Forestry for a term of four years. Ex-Governor Pardee formerly served as chairman of the State board of forestry in the administration of Governor Stephens. Other members appointed to the board are Swift Berry, Camino, forester for the Michigan-California Lumber Co.; W. O. Blasingame, Fresno, vice president of the California Cattlemen's Association; H. S. Gilman, Los Angeles, general manager of the San Dimas Water District and president of the Angeles Forest Protective Association; D. Eyman Huff, agriculturist, Orange County; A. J. Mathews, Susanville, former assemblyman; and Walter Mulford, professor of forestry, University of California.

Clark C. Heritage has been appointed senior chemical engineer in charge of the section of pulp and paper, Forest Products Laboratory, succeeding to the position ecently resigned by John D. Rue. Mr. Heritage ttended the University of Chicago and the Armour Institute of Technology, where he received his degree in chemical engineering in 1914. He then entered the pulp and paper industry as chemical engineer with the Nekoosa-Edwards Paper Co. at Port Edwards, Wis. Since 1925 he has been engaged in technical development work in the paper board industry with the Paper Board Corporation and in sales extension work with the Cornell Wood Products Co. His experience includes also the production of synthetic phenol and of war gasses and the redesign of chemical plants and development of new products. Mr. Heritage is a member of the Technical Association of the Pulp and Paper Industry and of the American Institute of Chemical Engineers, having served for several years as committeeman on chemical engineering education.

Axel J. F. Brandstrom joined the faculty of the College of Forestry of the University of Washington on January 1, 1928, as assistant professor of logging engineering. Since his graduation from the school in 1919 Mr. Brandstrom has had several years' experience as a logging engineer for Washington lumber companies and has for five years headed a general contracting firm.

John B. Burnham has resigned as president of the American Game Protective Association, having held that office continuously since the association was organized in 1911. He is succeeded by Carlos Avery, who has served the association first as vice president and recently as secretary-treasurer and editor.

Samuel J. Record, of the Yale Forest School, has sailed for Europe, where he will work to enlist the cooperation of scientists in an investigation of the forest resources of the Tropics. This project is sponsored by Harvey Firestone.

R. Y. Stuart, chief of the United States Forest Service, has been appointed by Secretary of Commerce Hoover to the vice chairmanship of the National Committee on Wood Utilization, an office recently resigned by William B. Greeley.

Valery Tikatchek, chief forester of the Ural district, Russia, and Alexander Karchewski, a mining engineer of Moscow who is a graduate of the Imperial Russian Forestry School, have come to the United States to study methods of logging and logging transportation and the Forest Service, especially its research organization. They will visit a number of the national forests, several of the forest experiment stations, and the Forest Products Laboratory.

Axel H. Oxholm, director of the National Committee on Wood Utilization, United States Department of Commerce, has sailed to spend the summer months in Scandinavia and central and western Europe. Mr. Oxholm will study sawmill operation, machinery and methods for producing lumber with minimum waste, and utilization of materials largely wasted in this country. He will also prepare to report on the possibilities of marketing American lumber in Europe.

Herbert J. Ninman, State blister rust control leader in Wisconsin, recently returned from an extended trip in Germany and Switzerland.

Prof. A. B. Recknagel, of Cornell University, has been appointed to cover developments in American forestry literature for the Forstliche Rundschau, a German forestry digest which is to make its appearance in July, 1928, and to be published quarterly. Professor Recknagel has served on the editorial board of the Journal of Forestry for 14 years.

William B. Greeley has accepted appointment to the board of directors of the American Forestry Association, filling the vacancy created by the resignation of Henry W. Shoemaker.

Edward A. Sherman, associate forester of the United States Forest Service, received the honorary degree of doctor of science from his alma mater, the Iowa State College, at Ames, Iowa, June 11, 1928.

Walter C. Lowdermilk is joining the staff of the California Forest Experiment Station July 1 on a permanent status as silviculturist. Mr. Lowdermilk has completed the residence requirements for a Ph. D. degree from the University of California.

W. C. McCormick has resigned as assistant State forester of North Carolina in charge of forest fire prevention, to take up work with the American Forestry Association in connection with a forestry education campaign in Georgia, Florida, and Mississippi. Mr. McCormick joined the North Carolina forestry organization early in 1926, after 15 years' experience on the national forests of the northern Rocky Mountains. His place in North Carolina has been filled by the promotion of Charles H. Flory, formerly district forester at Fayetteville.

Perkins Coville has reported at the Washington office of the United States Forest Service for duty as associate silviculturist in the office of forest experiment stations. Mr. Coville comes to the Forest Service from the Iowa Agricultural College, where he has taught forestry since 1922. He received the B. S. and M. F. degrees from Cornell University in 1918 and 1920, respectively, and had forestry experience in the employ of the Great Southern Lumber Co., James D. Lacey & Co., and the Weyerhaeuser Timber Co.

H. Colby, who since 1920 has headed the woodlands department of the S. D. Warren Co., Boston, has resigned to enter the employ of the Dead River Timberland Co. of Boston, and the J. Manchester Haynes estate, of Augusta, Me.

Earle H. Clapp, chief of the branch of research of the United States Forest Service, has received the honorary degree of doctor of science from the University of Michigan, of which he is an alumnus.

Samuel T. Dana, dean of the School of Forestry and Conservation of the University of Michigan, has received the honorary degree of doctor of science from Syracuse University.

Ferdinand W. Haasis, assistant silviculturist at the Appalachian Forest Experiment Station, has received the Ph. D. degree in plant physiology from Johns Hopkins University. Mr. Haasis's thesis was on the subject "Some relations of temperature and length of germination period to the percentage of germination of seeds, especially of pitch pine and rice."

Newly elected officers of the Texas Forestry Association are E. L. Kurth, Keltys, president; W. Goodrich Jones, Waco, president emeritus; E. O. Siecke, College Station, secretary-treasurer.

Charles W. Boyce, of the United States Forest Service, has joined the staff of the American Paper and Pulp Association, New York City, as secretary of the woodlands section.

C. Stowell Smith is the 1928 chairman of the California section of the Society of American Foresters, and F. S. Baker is again serving as secretary-treasurer.

H. J. Lutz is joining the staff of the Allegheny Forest Experiment Station, Philadelphia, as associate silviculturist. Mr. Lutz is a graduate of the Michigan State College and was formerly a technical assistant on the Chugach National Forest, Alaska. He was graduated from the Yale Forest School in 1927 and has since engaged in research in forest ecology at the Connecticut Agricultural Experiment Station. Hugo L. Sundling has been appointed to the staff of this station as assistant silviculturist. Mr. Sundling is a graduate of the Michigan State College, has had experience on the Tusayan National Forest, and spent the past year in graduate work at the Pennsylvania State College.

R. M. Lingren, instructor in forest pathology at the Forest School of the University of Minnesota, has just been appointed forest pathologist in the Bureau of Plant Industry and stationed at the Southern Forest Experiment Station. Mr. Lingren had graduate work in pathology after taking his degree in forestry at the University of Minnesota.

Louis J. Pessin, forest ecologist, has rejoined the staff of the Southern Forest Experiment Station, from which he resigned a year ago to become plant pathologist at the Texas Agricultural Experiment Station. A new acquisition to the staff of the station is F. I. Righter, who has had extensive forestry experience in the Tropics and who has just received the M. F. degree from Cornell.

C. Cyril Klein, district forester for western Maryland, has been transferred to College Park, Md., to take charge of the State forest nursery there.

S. R. Gevorkiantz has returned to his post at the Lake States Forest Experiment Station after a year's graduate work at the Harvard Forest. A new appointment to the Lake States station is that of H. F. Sholz, a junior forester who has studied forestry at the Iowa State College.

V. C. Clements, a graduate of the University of California under appointment as junior forester at the California Forest Experiment Station, has been transferred to the Washington office of the United States Forest Service for duty in the section of forest measurements.

Charles B. Abell, a graduate of Cornell, and Alden B. Hatch, a graduate of the Forest School of the University of Idaho, have been appointed to the Appalachian Forest Experiment Station.

Ernest L. Kolbe, one of this year's forestry graduates of Cornell University, has been appointed as junior forester to the Pacific Northwest Forest Experiment Station.

Bibliography

A Good Book on Insect Enemies of California Pines

By E. E. Carter, United States Forest Service

In Insect Enemies of California Pines and Their Control, F. P. Keen, of the Bureau of Entomology, has not only compiled a convenient reference book of the available information on his subject. He has also reduced the compilation into simple, easily read English that a layman can understand. The use of this bulletin will probably not be confined to California; it could easily serve as an introduction to the whole subject of forest entomology. The keynote is sounded in the first sentence—"Insects are an essential part of the vast association of living, growing, and dying organisms which we call a forest."

The California bark beetles and their destructive work are discussed adequately, but Keen does not stop there. He tells of parasites and predators, of borers and white ants, of cone beetles and saw flies. His final chapter heading is "The field identification of insects attacking California pines," and the chapter contains a guide to field identifications that should be useful throughout the West. This guide does not require the measurement of the length of the abdominal segments in millimeters or the determination of the hairiness of the elytra of a beetle, but is based on the readily seen work done by each species. It looks as if it could be used by the amateur. So does the bulletin as a whole.

(F. P. Keen: Insect Enemies of California Pines and Their Control. Bulletin No. 7, California Department of Natural Resources.)

Forestry in Wisconsin

The "six honest serving men" of journalistic fame must have been present in person at the editorial council where the report of the Wisconsin Commercial Forestry Conference was prepared. What and when and why, and where and how and who, are all well represented in the volume, which is entitled "Forestry in Wisconsin." The editing of the report is a remarkably successful piece of work. The result is a book packed with information and inspiration. It is attractive, easy to handle, and easy to read. And it is a valuable text and source book for everyone interested in timber production or utilization, forest conservation, land use, and all related matters, including the relation of forests to the social and æsthetic health of the Nation. Copies of the book may be obtained from H. L. Ashworth, 49 East Wells Street, Milwaukee, Wis.

Bureau of Railway Economics on Lumber

"Lumber" is the title of Bulletin 30 of the Bureau of Railway Economics. The bulletin is one of a series of studies by that organization on commodity prices in their relation to transportation costs. It deals with mill prices of lumber, the retail prices of lumber at consuming markets, and freight rates on lumber from milling points to important markets. It covers the three years 1924–26. The bulletin is the result of a study of lumber prices in their relation to transportation costs and presents general statistical data on production, distribution, and consumption of lumber. Only those species, grades, and sizes of lumber that enter into general construction operations are included in the discussion.

Copies of this bulletin can be obtained free by addressing the Bureau of Railway Economics, 1024 Transportation Building, Washington, D. C.

The Care of Ornamental Trees

The Care of Ornamental Trees, by C. F. Greeves-Carpenter, published by Macmillan, is a little book of 65 pages that may be easily read and quickly referred to. The author has endeavored to put into words of one syllable some of the things that the owner of a tree or a whole park full of trees may want to know. Very plainly he is directing his attention toward the owner of city or suburban property who has newly acquired an interest in the trees that grow upon it.

In his effort to keep away from technical terms the author sometimes labors, but the instructions bear the mark of one who has actually done the things of which he speaks.

Forestry Bibliographies Available

A limited number of copies of bibliographies on the following subjects prepared by Helen E. Stockbridge, librarian of the United States Forest Service, are available for distribution from the Washington office of the service: Brush disposal, Douglas fir, erosion, farm forestry, forest fire insurance, forest influences, Forest Service publications to 1925, forest soils, forest taxation, forestry books (in English), form and taper, New England States forest problems, phenology, plant breeding, shade trees, thinning, volume and growth studies, preparation of volume tables, water and light requirements of forest trees, windbreaks, and tree surgery.

Rubber Production in Africa

By E. N. Munns, United States Forest Service

Considerable interest has been evidenced of late in the possibilities of producing rubber on the African Continent. A summary of the existing information on this subject issued in 1926 by the Department of Commerce under the title "Rubber Production in Africa" indicates that the main source of rubber is a belt extending nearly across the continent along the Equator or a little to the north. This region is mainly covered by tropical evergreen forests and seems to be also the best for the production of Hevea rubber.

African rubber comes mostly from plants of the family Apocynaceae, the principal rubber-yielding tree being Funtumia elastica. Large quantities of rubber have also been gathered from various vines and so-called shrubs belonging mainly to the genus Landolphia and to other closely related genera. Varying amounts of rubber have been contributed to the markets by other species and other families.

During the first decade of the present century colonial officials and commercial companies in nearly all sections of tropical Africa encouraged the planting of rubber, the former by establishing experimental plantings and in some instances by urging the natives to plant rubber-producing trees. Practically all the wild species that were producing commercial quantities of rubber were tried; but by 1912, in tropical Africa as in the East Indies, it was found that Hevea was the best for planting.

The most extensive planting took place in German East Africa, where more than 100,000 acres of Ceara rubber was set out. These plantations were abandoned in 1914, and the trees that are left have only recently been retapped. In all Africa there are estimated to be some 38,000 acres of planted Hevea. A larger but unknown acreage of various other species includes Ceara, Castilla, Landolphia, and *Ficus elastica*. If fully tapped, the Hevea might produce annually some 5,000 tons of rubber.

So far, most of the African rubber production has been from wild species. In 1906 and again in 1910, the production amounted to more than 20,000 tons. Beginning in 1910 there was a gradual falling off until 1923, when a little less than 4,000 tons was produced. The production has recently increased and is likely to go close to 10,000 tons; but unless prices rise much higher, it is not likely that the production will again reach 20,000 tons.

In this publication each of 24 African political units is treated rather exhaustively. The subjects discussed include topography and climatic conditions as affecting the production of Hevea rubber; the land tenure and labor conditions; the history of wild rubber production, with an enumeration of the species yielding it and a description of the method of collecting it; and the possibility of future production. An account is given, also, of the experimental and commercial plantings of all the species.

An extensive bibliography is appended.

(H. N. Whitford and Alfred Anthony: Rubber Production in Africa. Trade Promotion Series No. 34. pp. 136. U. S. Department of Commerce, Washington, D. C., 1926.)

New Volume Tables for New Jersey

Associate State Forester Willis M. Baker, of the Department of Conservation and Development of New Jersey, is distributing four volume tables for short-leaf pine and two for southern white cedar, recently constructed by the department.

On the basis of the total heights of trees, the tables show for shortleaf pine the merchantable contents in board feet scaled by the international rule (one-fourth inch kerf); the total cubic contents of the tree including bark, stump, and top; the merchantable cubic contents exclusive of stump and top (above a diameter of 2 inches outside bark); and the cubic contents of tops above a 5-inch minimum top-log diameter. The converting factor used is 70 cubic feet to the cord. The contents of southern white cedar are expressed in cubic feet for the entire tree including stump, top, and bark, and in terms of numbers of poles and posts classified as fence posts, arbor poles, shade-tree stakes, and bean poles.

These tables are a useful addition to our knowledge of these two commercial forest trees.

New York Bulletin on Reforesting

There has recently come from the press a revision of Reforesting, Bulletin No. 2 of the New York Conservation Department, first issued in 1910. This bulletin is intended largely for the guidance of those who purchase trees from the New York Conservation Department for forest planting. It enumerates the reasons for planting, and states the conditions under which prospective planters may procure trees from the State nurseries. It covers the usual scope of publications of this type, discussing the species adapted for planting in New York State, when and how they should be planted, where it is best to set out transplants and where seedlings, care of plantations, and possible yields of white pine plantations. Discussion of the last-mentioned subject is based on Massachusetts data. Western yellow pine, red oak, basswood, and yellow poplar, which were suggested for planting in the 1910 edition of the bulletin, are no longer recommended and white spruce and northern white cedar have been added to the list of recommended species.

Old Bulletins Wanted

The Forest Products Laboratory, Madison, Wis., vishes to obtain copies of these three bulletins, now ut of print:

Experiments with Jack Pine and Hemlock for Mehanical Pulp, by J. H. Thickens. (Forest Service nnumbered bulletin, published 1912.)

he Grinding of Spruce for Mechanical Pulp, by . H. Thickens. (Forest Service Bulletin 127.)

Ground Wood Pulp, by J. H. Thickens and G. C. IcNaughton. (Department of Agriculture Bulletin 43, pts. 1 and 2.)

wedish Forestry Journal Adopts New Policy

The editors of the Journal of the Swedish Forestry ociety (Svenska Skogsvardsföreningens Tidskrift) ave announced a new policy. Hereafter the journal ill be devoted exclusively to reports of scientific rest investigations and papers on forest policy and rest economics. Book reviews will be included, but ie publication of material of purely local interest will e left to the popular bimonthly Skogen (The Forest). ll articles will be accompanied by full résumés in rench, German, or English, and those having more eneral international interest will be published in tenso in one of these languages.

The journal will be published in four large parts each ear, two before and two after the summer. Subribers can arrange to receive with it as supplements ie reports of the Swedish forest experiment station. With the 1927 volume the journal completed its ty-fifth year. The editor in chief is Henrik Hesselan, in charge of the natural science division of the wedish Institute of Experimental Forestry. The ssistant editor is Erik Lundh, secretary of the Swedish orestry Society and docent at the Forest School.

Henry I. Baldwin, Berlin, N. H., American repreentative of the journal, invites inquiries regarding ibscriptions and advertising and offers to forward aterial submitted for publication.

◆

The Forestry Primer published by the AmericanTree ssociation to mark the semicentennial of Governent forestry work in the United States had gone into) editions of 100,000 each since January 1, 1926. A rge proportion of the 2,000,000 copies have gone, on rect request from teachers, to public, private, and arochial schools throughout the United States.

◆

The Forest Taxation Inquiry of the United States orest Service has initiated the publication of progress ports, which will be multigraphed at irregular tervals. A limited number of copies of these reports ill be available for distribution outside the Forest vice.

Recent Books and Pamphlets

Bates, Carlos G., and Henry, A. J.: Forest and streamflow experiment at Wagon Wheel Gap, Colo.: final report, on completion of the second phase of the experiment. 79 pp. illus., maps. (U. S. Department of Agriculture, Weather Bureau, Monthly Weather Review, supplement no. 30.) Washington, D. C., 1928.

Bennett, H. H., and Chapline, W. R.: Soil erosion a national menace. 36 pp. illus. (U. S. Department of Agriculture circular 33.) Washington, D. C., 1928.

Bourke-Borrowes, D. R. S.: The teak industry of Siam. 52 pp. illus., map. Siam Ministry of Commerce and Communications, Bangkok, 1927.

Canadian Bureau of Statistics: Forestry in Canada, 1927–28. 32 pp. diagrs. Ottawa, 1928.

Central Committee on Lumber Standards: Revisions and proposed additions to the American lumber standards, softwood lumber, as reported to the U. S. Department of Commerce. 8 pp. illus. Washington, D. C., 1928.

Cheyney, Edward G., and Brown, R. M.: The farm woodlot of southeastern Minnesota: its composition, volume, growth, value, and future possibilities. 28 pp. illus. (Minnesota Agricultural Experiment Station bulletin 241.) St. Paul, 1927.

Curtin, Leo P.: Experiments in wood preservation, pts. 1–6. illus. American Chemical Society, New York, 1927–28.

Douglas, A. E.: Climatic cycles and tree growth, vol. 2: a study of the annual rings of trees in relation to climate and solar activity. 166 pp. illus. (Carnegie Institute of Washington publication no. 289, vol. 2.) Washington, D. C., 1928.

Hanson, Herbert C.: Revegetation of waste range land. 9 pp. illus. (Colorado Agricultural Experiment Station bulletin 332.) Fort Collins, Colo., 1928.

Harper, Roland M.: Natural resources of southern Florida. 180 pp. illus. State Geological Survey, Tallahassee, 1928.

Howard, William G.: Forest taxation. 7 pp. (New York Department of Conservation, Division of Lands and Forests, bulletin 8.) Albany, 1928.

Hubert, Ernest E.: Manual of wood rots for cruisers and scalers in the Inland Empire. 63 pp. illus. The Timberman, Portland, Oreg., 1927.

Japanese Ministry of Agriculture and Forestry, Department of Forestry: Outline of the work of the forest meteorological stations. 16 pp. map, tables. Tokyo, 1926.

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Lleó, Antonio: El riesgo de incendio en los montes. 95 pp. diagrs. Instituto Nacional de Prevision, Madrid, 1927.

Maryland Conservation Department: Fifth annual report, 1927. 114 pp. illus. Baltimore, 1928.

Maryland State Department of Forestry: Report for fiscal year 1927. 48 pp. Baltimore, 1928.

Massachusetts Tree Wardens' and Foresters' Association: Proceedings, 17th annual meeting. 25 pp. illus. Salem, 1928.

Polhamus, Loren G.: Experimental tapping of Hevea rubber trees at Bayeux, Haiti, 1924–25. 32 pp. (U. S. Department of Agriculture technical bulletin no. 65.) Washington, D. C., 1928.

Scott, C. W., and Parkinson, C. E.: The common oaks and chestnuts of Maymyo and Kalaw. 16 pp. illus. (Burma Forest Department bulletin no. 19.) Rangoon, 1928.

Scott, M. H.: Notes on the characteristics and minute structure of thirty woods indigenous to South Africa. 20 pp. (South Africa Forest Department bulletin no. 20.) Johannesburg, 1927.

Shirley, G. S.: Volumes of single trees and volumes and number of trees per acre from data collected in teak (Tectona grandis) plantations in Burma. 14 pp. (Burma Forest Department bulletin no. 17.) Rangoon, 1928.

Smith, Julian D.: Peru as a lumber market. 24 pp. (U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce, trade information bulletin no. 539.) Washington, D. C., 1928.

Spaeth, J. Nelson: Twenty years' growth of a sprout hardwood forest in New York: a study of the effects of intermediate and reproduction cuttings. 49 pp. illus. (Cornell University Agricultural Experiment Station bulletin 465.) Ithaca, N. Y., 1928.

Tubeuf, Carl von: Das schicksal der strobe in Europa. 32 pp. illus. Eugen Ulmer, Stuttgart, 1927.

United States Congress, House Committee on Agriculture: Forest products: report to accompany H. R. 12878. 7 pp. (70th congress, 1st session. House report no. 1363.) Washington, D. C., 1928.

United States Congress, Senate Committee on Agriculture and Forestry: Forest research: report to accompany S. 3556. 3 pp. (70th congress, 1st session. Senate report no. 742.) Washington, D. C., 1928.

United States Department of Commerce: Seasoning, handling, and care of lumber, consumers' edition: report of the National Committee on Wood Utilization. 63 pp. illus. Washington, D. C., 1928.

University of Nebraska, Conservation and Survey Division: Tree planting in Nebraska. 24 pp. illus. (Bulletin 1, conservation series.) Lincoln, 1928.

White, David G.: The hardwoods of the Appalachians. 20 pp. illus. (Appalachian Hardwood Club brochure no. 1.) Cincinnati, 1927.

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Ecology, January, 1928.—Soil changes and silviculture on the Harvard Forest, by R. T. Fisher, pp. 6–11 Mycorrhiza of southern pines, by L. J. Pessin, pp 28–33.

Forest Leaves, June, 1928.—Forest Service states position on the Yosemite timber, by Robert Y. Stuart pp. 139–140.

Industrial and Engineering Chemistry, May, 1928.— Effect of decay on the chemical composition of wood by Lee F. Hawley and others, pp. 504–507.

International Labour Review, March, 1928.—Forestr and rural employment in Great Britain, pp. 390–395

Journal of Forestry, May, 1928.—Adequate fire control, by Howard R. Flint, pp. 624–638. Observations on cutover pulpwood lands in the northeast by Marinus Westveld, pp. 649–664. Can the farme afford to grow timber, by Clarence Hill Burrage, pp 685–691. A special slide rule for foresters, b James L. Averell, pp. 722–723.

Naval Stores Review, June 2, 1928.—Experiments i improved turpentine methods, by Lenthall Wyman pp. 25, 27.

Outdoor Nebraska, April 1, 1928.—Nebraska's tre campaign for 1928, by George E. Condra, pp. 12–13.

Revue des Eaux et Forêts, March, 1928.—La forêt d Sille; son acquisition par l'état, by R. Potel, pp 137–142.

Southern Field, 1928.—Test on flow of gum at demonstration forest, S. C., by Austin Cary and Elois Gerry, pp. 2–5.

U. S. Department of Agriculture Journal of Agricultural Research, February 1, 1928.—Rates of gr of immature Douglas fir as shown by periodic re measurements on permanent sample plots, by Walte H. Meyer, pp. 193–215.

U. S. Department of Agriculture Monthly Weather Review, March, 1928.—Second phase of streamflow experiment at Wagon Wheel Gap, Colo., by Carlos G Bates and A. J. Henry, pp. 79–97.

West Coast Lumberman, May 1, 1928.—Rate of growt of Douglas fir forests, by Richard E. McArdle, pp 90–95. Invention of selective logging equipmen may solve problems, by J. A. Crawford, pp. 138–140 182–184.

Recent Publications of the Forest Servic

Miscellaneous Circular 36, Wichita National Forest an Game Preserve.

Map Folders: Cleveland, Modoc, Sequoia, Nationa Forests of the East and South, Road and Informatio Map for the National Forests of Oregon.

National Forest Administrative Maps: ¼-inch, Chelan, Colville, Cherokee; ½-inch, Selway, Chelan Colville, Allegheny.

U.S. GOVERNMENT PRINTING OFFICE:

FOREST WORKER

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Announcements

Farm Demonstration Celebration at Houston

The twenty-fifth anniversary of the beginning of farm demonstration work in Texas will be celebrated in Houston during the week beginning February 4, 1929. At that time will be held the annual Conference of Extension Agents of the South, and a meeting of the Southern Agricultural Workers Association.

Ohio Valley State Parks Conference

The Ohio Valley Regional Conference on State Parks this year will be held at Waddington Farm, Wheeling, W. Va., October 10–12.

National Grange to Meet in Capital

The sixty-second annual meeting of the National Grange will convene in Washington, D. C., November 14–23. Headquarters will be at the Willard Hotel.

American Conifer Seed Wanted for Foreign Use

Requests for seed of American conifers to be plante in foreign countries are coming to the United State Forest Service in increasing volume. Already officia requests have been received from foresters in some 1 countries. Most of these foresters have expressed a appreciation of the need for getting seed from the bes trees and from regions having climatic conditions sim ilar to those under which they desire to grow the specie Others have requested only that particulars be given to the kind of trees from which the seed are procure and as to the climate in which the trees have grow

Since the demand is large, anyone having collected small quantity of seed can send it to the office forest experiment stations, United States Fore Service, Washington, D. C., with the assurance tha the effort will not be wasted. With each packet seed should be sent information as to species and as whether the parent trees were of good vigor and ope grown, also as to the elevation and geographic locati at which the parent trees grew. Seed from promisin rapid-growing trees are of course especially desire

Because the free edition of this periodical is necessarily limited, it can be distributed without charge outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the FOREST WORKER can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

Material offered for publication in the FOREST WORKER should be addressed to L. C. Everard, Editor, United States Forest Service, Washington, D. C.

FOREST WORKER

Washington, D. C. SEPTEMBER, 1928 Vol. 4, No. 5

State Forestry

Fire Protection Improvements for the Dismal Swamp

Since June two new fire towers overlook the Virginia portion of the Dismal Swamp. One stands at he head of Jericho Ditch, by the side of the State oad, about 1½ miles east of Suffolk. The other is outh of Wallaceton at Angle Siding, in the heart of he swamp, close to the Dismal Swamp Canal and the State road. Each is 100 feet high to the base of the abin, with inside stairway.

In providing these towers the Virginia Forest Servce had many cooperators. Landowners of the district hat have contributed 2½ cents per acre for fire proection during the year 1928 include the Camp Manuacturing Co., the Richmond Cedar Works, the John L. Roper Lumber Co., the Stave and Timber Corporation, nd the Ackerly Lumber Co. Among the public rvice companies that made contributions of from 100 to $300 toward the erection of the towers are he Norfolk & Western Railway Co., the Seaboard Air Line Railway Co., the Atlantic Coast Line Railroad, the Virginian Railway Co., and the Virginia Electric & Power Co.

Additional protection is afforded to the Dismal wamp by a tower recently erected by the Camp Manuacturing Co. in Hertford County, N. C., overlooking he southwestern part of the swamp.

War Veterans Organize to Fight Fire

A volunteer organization of 500 World War veterans as recruited by the Sacramento, Calif., post of the merican Legion this year for emergency duty in ghting forest fires. E. T. Cook, director of forest fire revention for the Sacramento legionnaires, organized he men in units of 50 and formally placed them at the ommand of State Forester M. B. Pratt. The post ranged for trucks to take the men to the fire line and r the necessary supplies and tools.

The men were so organized that they could be called it in first, second, and third line units rated according to the rapidity with which they could be assembled and according to whether they were available for short or long periods of service. H. M. Witbeck, a detective of the Sacramento police force, was given charge of mobilizing the units when they were "called out." L. M. McGinnis, an inspector of the State motor vehicle department, was placed in charge of mobilizing transportation facilities, supplies, tools, and provisions. Mr. Cook assumed the responsibility of directing the legion fire fighters in the field, working in conjunction with State forest rangers.

An Indiana Farm Woodland Success

From R. F. Wilcox, acting State forester of Indiana, comes a story of what an Indiana farm woodland has done for its owner in the past 28 years. For $570 John Fensel, of Montpelier, Ind., bought 20 acres of hardwood forest in 1900, just after all the timber down to 3 inches diameter had been cut for spokes. Since that time the woodland has supplied the timber for the following buildings: A double corn crib 20 by 24 feet, a sheep barn 20 by 30 feet, a horse barn 20 by 36 feet, a garage 10 by 14 feet, and a cellar house 12 by 14 feet. Not less than 150 posts and 40 cords of wood have been taken from the forest, either to be used on the farm or to be sold. In addition, the ash was sold for handles in 1918 for $400 and the elm was sold for barrels in 1924 for $300. For the standing timber Mr. Fensel has been offered $3,000.

Mr. Fensel has "farmed" his woods, choosing the mature and undesirable trees for cutting, and has protected it from fire. He permitted grazing for one year only. The prolific crop of young growth in his woodland forms a striking contrast to the complete absence of tree seedlings on an adjoining woodland area owned by his brother, which has been heavily pastured.

This woodland was the first forest to be approved for classification under the Indiana forest land taxation act of 1921.

Vermont Adds to Its State Forest Acreage

In the fiscal year ending June 30, 1928, the State of Vermont received a gift of a new State forest, bought additions to three of those formerly created, and established one new State forest on purchased land. These acquisitions, 2,430 acres in all, brought the total area of Vermont State forests to 33,725 acres. The new Granville Reservation, which was received as a gift from ex-governor Redfield Proctor, comprises 900 acres in Granville Gulf extending along the highway for a distance of about 6 miles. The additions made during the year increased the Calvin Coolidge Forest by 150 acres, the Proctor-Piper Forest by 460 acres, and the Groton Forest by 300 acres. Usually the Vermont appropriation for purchase of land for State forest purposes is devoted to making additions to existing forests. In departing from this policy to buy the 620-acre Willoughby State Forest, in the Town of Sutton, the State forest service provided the northeastern part of the State with its first State-owned forestry demonstration area.

The complete list of Vermont State forests, with their locations and areas, is as follows:

Forest	Town	Acres
L. R. Jones	Plainfield	600
Mansfield	Stowe	5, 000
Camels Hump	Duxbury	4, 500
Groton	Groton, Peacham, and Marshfield	15, 300
Lyndon	Lyndon	75
Charles Downer	Sharon	800
Proctor-Piper	Cavendish	884
Calvin Coolidge	Plymouth	879
Townshend	Townshend	700
Arlington	Arlington	225
Hapgood	Peru	100
George Aiken	Mendon	800
West Rutland	West Rutland	350
Putnam	Worcester	1, 400
Mount Philo	Charlotte	160
Ainsworth	Williamstown (Gulf)	432
Granville	Granville (Gulf)	900
Willoughby	Sutton	620
		33, 725

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A committee of North Carolinians headed by Dr. Joseph Hyde Pratt is trying to find a way to purchase and preserve in State ownership the Poole woods, a 75-acre tract of virgin shortleaf pine and hardwoods about 5 miles southeast of Raleigh. This woods is perhaps the only piece of virgin timber in eastern North Carolina.

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The Pennsylvania Game Commission has charge of 102,541 acres of forest lands. These lands were purchased from a fund provided from fees paid for resident hunting licenses. This fund amounts to about $378,000 a year, and entirely supports the State's game management activities.

New York Buys More Forest Land

Purchase of 11,667 acres of forest land was approved on May 31 by the board of commissioners of the New York Land Office. In the Adirondack area there was approved, among other lands, the so-called Eagle Point property on the westerly side of Schroon Lake. This tract, which has an excellent sandy beach and fronts on the main New York-Montreal highway for approximately a mile, is to be developed as a public camp site. A loop of old road that was abandoned last year when the highway was straightened at this point runs through the middle of the property and helps to make it desirable for development as a camp for automobilists. A contiguous tract of about 10,000 acres in the westerly end of the town of Ticonderoga, bounded on the west by State-owned lands and including many ponds, lakes, and streams, is among the lands approved for purchase.

In the Catskill area there was approved a parcel of approximately 45 acres that includes about five-eighths of a mile of fishing rights on the Beaverkill trout stream and also about one-fourth of a mile on Berry Brook, a tributary. With two adjoining parcels recently acquired by the New York Conservation Department, State purchase of this tract will open to the public nearly 2 miles of the Beaverkill stream.

Virginia Runs a Bobwhite Farm

Quail for stocking the woods and fields of Virginia are being obtained by large-scale propagation from brood stock that is kept in captivity year after year. The work is carried on at the State game farm at Boulevard, Va., by W. B. Coleman, who is credited by the Maryland Conservationist with being the first to succeed in rearing large numbers of bobwhites from stock held in confinement through a succession of years. In 1927, 158 hen birds on the farm produced 10,626 eggs, from these eggs 7,023 chicks were hatched, and more than 4,000 of the chicks were reared to maturity. Some 1,000 quail were kept at the farm over the past winter. The Virginia Commission of Inland Fisheries and Game has signified its willingness that members of game organizations of other States should come to the game farm and learn Mr. Coleman's methods.

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The 400-acre deer preserve of former State senator J. E. Burleson near Spruce Pine, Mitchell County, N. C., has been taken over by the North Carolina Department of Conservation and Development. The preserve now contains about 350 deer. It is planned to keep this herd intact and to use the young of these animals to stock State game refuges and other parts of the State.

Improvement Cutting at a Profit in Indiana

An improvement cutting was made this year on about 75 acres of the Clark County State Forest, Henryville, Ind. This forest was burned over about four years before the State acquired it in 1903. In 1908 it was clear-cut of every tree that would yield a crosstie. In the cutting made this year only overmature trees and trees with defects due to the old fire scars were removed. The substantial profits from this improvement cutting are shown by the following figures:

Contract prices:
- Felling trees and cutting into log lengths, 10 cents per log.
- Skidding to the mill, 10 cents and 11 cents per log.
- Sawing ties, 20 cents each.
- Sawing lumber, $7.50 per 1,000 board feet. (State gets the slabs for wood.)
- Hauling ties to railroad (2 miles), 14 cents each.
- Loading ties, 3 cents each.
  (Cost of ties f. o. b. cars, 58 cents each.)

Returns (loaded on railroad cars):	
2,834 crossties, at $1.16	$3, 287. 44
17,000 feet lumber, at $15	255. 00
20,000 feet lumber, at $30	600. 00
50 cords fuel wood, at $3	150. 00
400 cords fireplace wood, at $4.50 (delivered at Indianapolis)	1, 800. 00
Total	6, 092. 44
(Returns per acre, $81.23.)	
Operating costs (loaded on railroad cars):	
2,834 crossties, at 58 cents	1, 643. 72
37,000 feet lumber, at $15	555. 00
50 cords fuel wood, at $2.50	125. 00
400 cords fireplace wood, at $4 (includes freight to Indianapolis)	1, 600. 00
Total	3, 923. 72
(Costs per acre, $52.31.)	
Profit and stumpage	2, 168. 72
(Per acre, $28.92.)	

North Dakota Farmers Plant Shelter Belts

Eighty-two farmers in 37 counties of North Dakota shared 75,000 trees furnished by the State forest nursery this spring, planting them as shelter belts on land prepared for the purpose by summer fallowing in 1927. Seventy-nine farmers in Mountrail, Ward, and Grant Counties planted shelter belts with 100,000 trees that they bought through a local forestry committee under the direction of their county agents and Extension Forester Gillett.

Each one of these farmers had a visit last summer from Mr. Gillett, who told him how to prepare his land for shelter belt planting and made a sketch of his farmstead and planting site. Later a planting plan was drawn from this sketch and mailed to the farmer.

East Texas Chamber of Commerce to Promote Forestry Practice

A forestry and highway department has been created by the East Texas Chamber of Commerce, an organization made up of 10,000 members in about 67 counties having a population of not less than 2,500,000. This department will cooperate with the Texas Forest Service and with private agencies in efforts to promote the practice of forest protection and other forestry measures in eastern Texas.

Clarence Ousley has been chosen to head the new department. Mr. Ousley is a former assistant secretary of agriculture who has served as editor of agricultural journals and as director of the Extension Service of the Texas Agricultural College. In recent years he has directed the activities of the National Boll Weevil Control Association and the Texas Safe Farming Association.

North Carolina Forestry Association Recommends New Legislation

A list of recommendations drawn up by the legislative and executive committees of the North Carolina Forestry Association is to be submitted by the association to the general assembly of 1929. As summarized by Dr. Joseph Hyde Pratt, president of the association, it calls on the legislature to submit to popular vote at the next general election a constitutional amendment giving the general assembly full power and authority "to prescribe for all classes of forest land, farm woodland, and wild waste lands such methods of taxation as will develop and conserve the forest resources of the Commonwealth." Second, it calls for legislation authorizing the planting and protection of roadside trees and shrubs, and providing means for supervising the planting and protection of trees. It requests increased appropriations for the acquisition of lands for State forests, and legislation that will permit the United States to acquire land in the piedmont and coastal plain regions of North Carolina for the establishment of national forests. Legislation heretofore adopted by North Carolina permits the establishment of national forests in the mountains of the western part of the State only.

* * *

A 162-acre park on the shore of Lake Tahoe, including Rubicon Point, has been offered to the State of California by William S. Bliss, Walter D. Bliss, and Miss Hope Bliss, of San Francisco, in honor of their father, Duane L. Bliss. The gift is contingent on the State's acquisition of additional land in the Tahoe region.

Pine Plantation Sold at a Profit

In a recent sale of farm property near Tarentum, Allegheny County, Pa., reported by the Pennsylvania Department of Forests and Waters, $800 was paid for a plantation of northern white pine established seven years ago on about 6 acres of land unsuitable for agricultural crops. The seller, Fred Mathia, established the plantation in 1921 with 5,000 2-year-old and 2,000 3-year-old seedlings from the State nurseries. Ninety per cent of the trees have survived, and some of them have reached a height of 9 feet. It cost Mr. Mathia not more than $75 to make the plantation. Thus his gross profit, seven years after the planting, is $725.

Growth of a Pennsylvania White Pine Plantation

The 22-year-old Caledonia northern white pine plantation on the Michaux State Forest of Pennsylvania, along the Lincoln Highway between Gettysburg and Chambersburg, was thinned this year for the second time. The second thinning has left 1,300 trees per acre with an average height of 32 feet and a diameter at breast height of 5 inches. The tallest tree is 38 feet in height and the largest diameter is 7 inches. The wood volume is 2,500 cubic feet per acre, or 1.93 cubic feet per tree.

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Seed extraction plants have been established by the New York Conservation Department at its Saratoga and Lake Clear forest nurseries. Each has a capacity of 3,000 bushels of cones. When the plants are in full operation they can provide seed enough for planting at the present rate and also allow for the normal increase for several years to come. Their operation will cut in half the State's bill for seeds of coniferous trees. It is expected to place the Lake Clear plant in operation this fall and the plant at the Saratoga nursery next year.

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An 80-foot steel lookout tower has been erected by the North Carolina Department of Conservation and Development 1 mile north of Windsor, N. C., on the Stokes Road, one-fourth mile west of State Highway No. 30.

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Twenty-five thousand pine transplants were planted at a lake in Cherry County, Nebr., this spring by the State bureau of game and fish.

Many Organizations Cooperate in Colorado Tree Planting

This spring 120,000 trees were sent out by the State forester of Colorado to be planted on 763 farms. Under the provisions of a Clarke-McNary agreement, the trees were sold at cost. A number of these farm plantings were made by organizations. The Camp Fire Girls of Greeley, Colo., set out several thousand western yellow pine and other trees on farms adjacent to highways, the Izaak Walton League made some plantings on farms bordering upon lakes, the De Molay boys planted several thousand trees, and the Kiwanis Club of Fort Collins made a planting on a farm some 3 miles west of the town where they hope some day to have a picnic grove.

Species that were ordered in large numbers were western yellow pine, honey locust, American elm, and blue spruce. For dry-land planting in eastern Colorado State Forester Morrill recommends western yellow pine, and the combination of Russian olive with western yellow pine for windbreaks. Honey locust and hackberry can be substituted for the western yellow pine, but are not so successful in resisting drought. In irrigated regions Mr. Morrill suggests that the rapid-growing lanceleaf cottonwood be used in connection with the Russian olive for windbreaks. Other species offered were laurel leaf willow, European white willow, Carolina poplar, and white ash. A few balm-of-Gilead poplar were provided for planting at elevations of more than 7,000 feet, and some Chinese elm were offered for experimental planting.

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In the face of the most serious fire situation that had arisen in California this year, on August 25 the State director of finance granted an additional $20,000 to strengthen the State forest patrol. This addition made California's 1928 appropriation for forest fire protection $105,755, the largest in the State's history.

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Citizens of Inverness, Point Reyes Peninsula, Calif., this year have arranged through a cooperative agreement with the State to have a State ranger stationed there, paying $1,000 toward his salary. This action is the result of a fire of last fall that destroyed a large quantity of Bishop pine and threatened to wipe out the town.

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The woodlands of New Hampshire, except those of Coos County, were closed to all unauthorized entry by proclamation of the governor on May 14. The ban was lifted on May 19, when the fire situation was relieved by a heavy rain.

Education and Extension

American Forestry Educational Project in the South

An investment of $150,000 in public forestry educaion has been agreed upon by the States of Florida, Georgia, and Mississippi in cooperation with the American Forestry Association and with other friends f conservation. For the support of a 3-year campaign ach of the three States has pledged $19,500. The ssociation has taken the responsibility of raising a otal of $91,500, of which $30,000 has been pledged by he Commonwealth Fund of New York, $30,000 by ohn D. Rockefeller, jr., $4,200 by the Florida State Board of Forestry, $9,000 by the Georgia State Agriultural College, and $10,500 by the Georgia State Board of Forestry. Other amounts have been pledged y George D. Pratt, president, and other members of he American Forestry Association.

The primary object of the campaign will be to arouse opular interest in preventing and suppressing forest res, and particularly to combat the practice of woods urning. To reach the rural population of the three tates lecturers will be sent out in autotrucks equipped ith electric generators, motion-picture projectors and lms, and exhibits, according to the system that has een practiced for more than five years with excellent esults by the Canadian Forestry Association.

The State forester of each of the three States plans to ssign a member of his staff to the project for an ndefinite period. W. C. McCormick, formerly assistnt State forester of North Carolina, has been employed s regional director. He is charged with the responsiility of coordinating activities in connection with the roject, and in cooperation with the State foresters ill plan the work of the field men to be employed Ir. McCormick's headquarters are at Thomasville, Ga.

ntensive Fire Prevention Effort in Texas

In 1927 the forest patrolmen of Texas visited very school in the patrolled area during both the pring and the fall fire season. The patrolmen also nterviewed 27,000 farmers, stockmen, tourists, and ther individuals. A teacher of one of the east Texas chools was employed during the summer months to how forestry motion pictures and to give forest fire revention talks. Programs were given in 95 rural ommunities and reached 12,800 people. Some 35,000 ardboard fire-prevention posters were put up along oads through the piney woods, and on the main traveled highways 80 metal fire signs, 3 by 6 feet, were erected. Forestry exhibits were shown at three of the largest east Texas fairs.

An indication of the results of this special effort in public education is seen by the Texas Forest Service in the fact that during the year 3,234 people volunteered their services in helping patrolmen to extinguish fires.

Fire Prevention Propaganda on School Book Covers

A device of the Texas Forest Service for imbedding the fire-prevention idea in the minds of children is the distribution of a school-book cover bearing fire drawings and slogans. The cover is made of heavy kraft paper. On both front and back are pictures of humanized trees and the slogans "We trees are your friends—help protect us," and "Fire is our worst enemy—never start one." Eight fire-prevention rules are given.

It is stated that the Pennsylvania Department of Forests and Waters has bought 400,000 copies of this book cover.

In Louisiana the State division of forestry is preparing a design for a fire-prevention book cover which it expects to distribute through the State. On the front is a picture of a live oak tree, and the back displays a fire picture with the legend "Help stop this." Five fire-prevention cautions appear under the head "Bring back our forests." This cover is to be made of paper produced from Louisiana pine and will bear a statement to that effect.

Ribes Eradication by New York Boy Scouts

On the Sullivan County, N. Y., vacation ground of the Boy Scout Foundation of Greater New York two crews of scouts have been at work this summer eradicating Ribes under the direction of two blister-rust control foremen. The camp ground of 12,000 to 14,000 acres of hilly land along the Delaware River includes 2,000 or 3,000 acres of northern white pine. The blister-rust crews camped in the pine woods with the foremen. The boys worked without pay. The "White Bar Trail" emblem, previously awarded on the satisfactory completion of a 5-day camping and hiking trip of 60 miles, was awarded to each scout who satisfactorily completed a certain period of duty with the crews.

Ranger School Conference at Wanakena

On August 24 the New York State Ranger School at Wanakena, on Cranberry Lake in the Adirondack wilderness, dedicated a new concrete building that is designed to serve as home and school for 70 students and faculty. On the day following its dedication the new building was the scene of a conference on ranger school education. The conference was presided over by Dean Henry S. Graves, of the Yale Forest School. Dean Graves' address is reported in part as follows:

> The problem of forest education extends beyond the professional school. The future of forestry is dependent not only on the ability, vision, and sound judgment of the professional foresters but also on the intelligence and skill of the men down the line—the superintendents and foremen of local forest activities and the workers in the woods and at the mill. The key to successful work in forest protection, silviculture, or utilization is oftentimes the interest, enthusiasm, and ability of the local field officers, the ranger, the woods foreman or logging boss. The training of these men for their special work in the forestry undertaking is as important as that of the professional forester.
>
> Heretofore our educational efforts have been directed chiefly to the collegiate school and the training of men for the directive work in forestry. We have largely neglected the problem of training men for the special jobs in the forest and factory and for the secondary executive positions for which a collegiate training is neither necessary nor suitable. We have in the United States 25 collegiate institutions offering a training in forestry and only one regularly established ranger school, namely, the New York State Ranger School, whose progress and success we are celebrating to-day.
>
> It is the task of vocational education to meet the pressing need for better trained field personnel in the forest and mill. The recognition of this situation does not in any way minimize the importance of the collegiate school and of advanced educational work in forestry. Organized vocational education would supplement the work of the regular forest schools. It would fill a wide gap in our present structure of forest education.

In connection with the dedication of the new building of the Wanakena school, announcement is made that 15 acres of land has been added to the school's forest as a gift from the Hon. Louis Marshall, president of the board of trustees. The gift plot borders the school forest for about one-fourth mile along the south boundary and simplifies the boundary line to a considerable degree. The land has been logged but never burned, and on it are growing many old hardwood trees with a fine crop of second-growth hardwoods underneath.

Pasadena Puts Over American Forest Week

American Forest Week, 1928, found a hospitable reception in Pasadena, Calif., according to the report of Ranger M. H. Davis. Mr. Davis, who is stationed in Pasadena as fire dispatcher of the Angeles National Forest, began a forestry education campaign early in April, with semiweekly talks broadcast from radio station KPSN. Ranger Davis and Rangers B. L. Coulter and W. T. Murphy, also of the Angeles Forest, gave talks at nearly all the grammar schools of the city, showing in connection with each talk the one-reel motion picture, "The Angeles National Forest." One Pasadena newspaper alone gave the campaign 214 column inches of space. Forestry talks were given by members of the American Legion before all the service clubs and by Ranger Davis before the Pasadena Elks and Optimists, the Pasadena and Lamanda Park American Legion Posts, and other organizations. An essay contest sponsored by the Izaak Walton League set children in 20 schools to work on the subject "What forest conservation means to Pasadena." The winning essayist in each school received a pair of round-trip tickets either to Mount Lowe, on the Pacific Electric Railway, or to Mount Wilson, on the Mount Wilson stage line. The second prize in each school was a pair of tickets to one of the Pasadena theaters. First and second prizes for the entire city were $10 and $5, respectively, given by the Pasadena Merchants Association, and the school attended by the child who won first prize for the city received a $20 picture presented by the Pasadena Chamber of Commerce.

Nebraska Extension Forester Reports Important Plantings

The Chicago, Burlington & Quincy Railroad in cooperation with the Agricultural Extension Service and with farmers whose lands adjoin the right of way planted 7,000 trees this year on the Sterling Holdrege division between Holdrege and Grant, Nebr. The purpose of the planting was not only to beautify the right of way but to provide the railroad with a snow fence and the farmers with a shelter belt. During American Forest Week all divisions of this road in Nebraska attached to dining-car menu cards a sheet giving the history of the Nebraska National Forest.

In celebration of Arbor Day and American Forest Week 1,537 Nebraska schools planted trees on their grounds and school children of 56 counties competed in an essay contest on "Trees and tree planting." Prizes for the winning essayists totaling $100 were provided by the Nebraska Nurserymen's Association.

Community forest plantings in Nebraska reported this year by Extension Forester Clayton W. Watkins include the planting of 2,800 trees at Fremont and of small numbers of trees at Atkinson, Inman, and Ravenna by local chapters of the Izaak Walton League.

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During the past winter and spring 30 farm woodland demonstrations, covering 650 acres, were established in Richland County, Ohio, by Extension Forester F. W. Dean in cooperation with County Agent John Gilkey. Trees of undesirable species and grapevines were removed. The areas have all been classified under the forest tax act, which means that they will be used strictly for timber growing purposes and all livestock excluded.

Vhere, When, and How to Plant White Pine

The Extension Service of the University of New Iampshire has issued directions for planting the orthern white pine which bring together in compact orm the essentials for successful planting of this species. t is pointed out that "white pine can not be expected) make progress if planted in bog holes or left to row under dense shade. Pine planted too deep is ure to be retarded or killed. No blanket rule for pacing can be laid down. To offset possible weevil amage, and also to keep the size of the knots at a inimum, trees need to be planted 6 feet by 6 feet or oser on open land. On sprout or cut-over land only)0 or 800 trees to the acre are needed. White-pine antations must be free from currant and gooseberry ushes to be safe from the blister-rust disease. A antation usually needs to be freed from competing eed trees, such as gray birch, within a few years after anting."

Further directions are as follows:

Do not plant white pine underneath hardwood on heavy soils. Do t plant white pine underneath gray birch on sandy or light soil unless e birch are to be cut within five years. Do not plant during the mmer. Do not plant on a cut-over pine lot until the second year after e pine has been cut, in order to avoid damage from the pales weevil. ı soil that is too wet, or that is extremely dry and sandy, white pine ll not make good growth.

On field land plant at least 1,000 trees per acre. In young stands nsity is in direct proportion to quality. On cut-over land where oups of desirable hardwood sprouts from small stumps less than 2 ches in diameter or seedlings of species such as white ash, oak, white rch, rock maple [sugar maple], and basswood are growing, do not ant among such groups, but allow them to come up along with the rrounding planted pine. This will lead to the development of a desirle mixed forest of pine and hardwood. When planting among hardod stumps, avoid planting close to the stumps. The planted trees ll thus have a better opportunity to compete with the hardwood stool routs. Keep hardwood sprouts from growing up over the tops of anted pine. Sprouts need not be cut clear back to the ground.

Protect white-pine plantations from disease such as blister rust and m insects such as white-pine weevil.

Red pine [Norway pine] is often suitable for very light soils or for sites ere there is apt to be severe damage from the white-pine weevil. d pine is not susceptible to white-pine blister rust, is usually free from evil damage, is more resistant to fire than white pine, but does not lure shade so well as white pine. Red pine is susceptible to what is own as sweet fern rust, but this disease seldom causes serious damage. d pine lumber is not suitable for such general use as white pine lumber.

On sprout land use 4-year-old transplants. On field land 3-year-old nsplants usually give satisfactory results. Trees can be purchased m the State forest nursery at Gerrish, N. H., or at commercial forest series.

f trees are not to be planted as soon as they are received, they should heeled in immediately upon arrival. Save the moss in which the s are packed, for use at the time of planting.

When planting, carry the trees in a planting basket or bucket in the tom of which damp moss has been placed. Do not have the roots ered with wet clinging mud that causes them to stick together. On out land slit planting is satisfactory. On sod land mattock planting y be used but is not necessary. For fall planting under all conditions planting should give the best results. Fall planting properly done es satisfactory results. When using the slit method, work the plant- tool back and forth enough to form a space for the spread of the ts. There are several kinds of tools for slit planting. One practical tool has a blade about 6 inches wide and 5 inches long with a bar for the foot at the top. This is attached to a peavy handle. The tool is strong and has weight enough to be forced down among roots and rocks, while the blade is short enough not to cause too deep planting. The hole made with the mattock is dug with two or more strokes. The first stroke removes the sod and the second makes the hole. Do not plant too deep, but try to get the tree as deep into the soil as it was when taken from the nursery. Do not bunch the roots, but spread them by a light shake when the tree is placed in the ground. Firm the tree in well with the heel.

To make the investment sound, classify the plantation under the New Hampshire Walker classification law.

The test of good planting is not just whether the trees live, but whether they make good growth during the first few years after planting.

Northern White Pine for Underplanting

"In Connecticut the best tree for underplanting at the present time is northern white pine," Alfred A. Doppel advises Connecticut farmers in an extension bulletin of the State agricultural college. "This species is capable of enduring more shade than red pine [Norway pine] and, though it is not so tolerant in this respect as the spruces, it outstrips them in height growth. When the pines attain a height of 5 or 6 feet the hardwoods may be removed without fear of the sprouts suppressing the pines. The gradual removal of the overstory, if practicable, is better because it permits the sensitive tissues of the shade-grown pines to become hardened to full exposure, otherwise sun scald may result. Another desirable feature of this method of changing the composition of the stand is that the white pines will be almost 100 per cent straight, owing to the fact that the white-pine weevil does not like to lay its eggs on trees growing under shade."

A "Grow Sawlogs" Campaign in Arkansas

In his efforts to dissuade farmers of southern Arkansas from clear cutting their young pine timber for pulpwood Extension Forester W. K. Williams has now been assured of the support of the Dallas County Agricultural Committee. At a meeting in July this committee of 10 farmers and 4 business men unanimously indorsed Mr. Williams's plan for a forestry education campaign for the second half of 1928. Together with lectures and advice to farmers on growing timber to sawlog size rather than selling young timber cheaply for pulpwood, this plan includes lectures and motion-picture showings on forest-fire prevention and the establishment of four well-located timber-growing demonstrations.

Mr. Williams's efforts in Dallas County have been energetically seconded by M. R. Warner, county agent.

Dallas County contains 355,000 acres of woodlands, of which 65,000 acres are owned by farmers.

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Of the 39 county agents in New York State who are graduates of the New York State College of Agriculture, 21 have had at least one course in forestry.

Farmers' Tree-Identification Contest in North Carolina

In advance of the annual farmers' short course given at the North Carolina State College, Raleigh, July 24–27, it was announced throughout the State that Extension Forester R. W. Graeber had arranged a tree-identification contest in which the prize would be a wood-sawing outfit of the type to be attached to a tractor for sawing stovewood. As the result about 100 interested contestants appeared, some of them bearing specimens of foliage which they had been collecting for weeks and wished to have identified before they entered the contest. The contest included 50 trees, for each of which were shown specimens of foliage and a full section of the trunk with bark. The five men and the five women who made the highest scores were introduced by Mr. Graeber to an audience of 1,000 that came to see motion pictures. State Forester Holmes presented each contestant with a copy of his forest tree guide, and Mr. Graeber handed or mailed to each a correct list of the trees that had been shown in the contest.

Sterilizing Seed Beds with Steam

The University of Washington reports good results from the first year of its experiments in raising western conifers in seed beds sterilized with steam.

Equal quantities of seed of Douglas fir, Sitka spruce, and western yellow pine were planted in parallel beds. A steaming pan slightly larger than the standard 4 by 4 by 12 seed bed was made of fir and cedar lumber and lined with roofing paper and tar. The steaming was done on June 1. Although the soil was well worked before steaming, its damp condition and the fact that the available steam pressure was under 10 pounds necessitated a long steaming period. Tests were made both with a single hour period of steaming and with an hour period repeated after an interval of 24 hours. A temperature of 100° C. was obtained at least 8 inches beneath the surface within 30 minutes.

At the end of September there were 30 per cent more Douglas fir seedlings in the steamed beds than in those left unsteamed. Sitka spruce showed an equally great advantage where steam had been used and the western yellow pine showed an even greater advantage. Little difference in results appeared between the once and the twice treated beds.

Weeding required only about one-sixth as much labor in the sterilized as in the unsteamed beds. In the steamed beds there was some appearance of fern prothallia and marchantia thalli, of which the control beds showed no trace.

Late in the summer, both roots and tops of the seedlings in the control beds were found to be markedly undeveloped in comparison with those in the steamed beds. This was found to be due to "root sickness" attributed to the same fungi that were believed t have caused the first mortality. During the fall an winter months the healthy plants outstripped to considerable degree those with the affected roots Sitka spruce in the control beds showed especiall poor development during this period and suffere from much frost heaving. Very little difference i development, however, was shown at this period between the western yellow pine in the sterilized bed and that in the untreated beds. Apparently the seed lings of this species had passed the critical stage.

This preliminary investigation is being repeate together with a study of the pathogenic and non pathogenic soil fungi involved, with special referenc to the reaction of the fungi to steam heating.

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Temperature under the bark may have an importan bearing on the variation in the rates at which differen sizes of northern white pine slash decompose, accordin to a study made by A. W. Gottlieb on the Harvar Forest. Through a series of readings made with system of thermocouples in the month of August i was found that subcortical temperature reached th highest point in sticks from 4 to 6 inches in diamete Lower temperatures were shown by sticks of othe sizes in the following order: 6 to 8 inches diamete 2 to 4 inches, 8 to 10 inches, and 0 to 2 inches.

Previous work by S. A. Graham showed that hig temperatures beneath the bark of logs limit the activ ties of subcortical insects.

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The De Molay forest on the Columbia Nation Forest, Wash., was enlarged this spring by the plan ing of 38,000 trees on 55 acres. This work is a co tinuation of an 85-acre planting financed last fall b the boys of the Order of De Molay in the State Washington as their "special patriotic and civic ser ice" of the year. The plantation is situated abo 15 miles north of Carson, Wash., on the Evergree Highway. The planting is done by an experience crew under the direction of a forest officer.

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Forty-five Four-H Club boys of Louisiana have bee rewarded for good work in forestry during the pa year with prizes donated by the Great Southern Lu ber Co. The two highest awards are free trips to t national Four-H Club congress that will be held i Chicago during November. Five prizes consisted i trips to the operations of the Great Southern Lumb Co. and 38 were trips to Four-H camps in various par of the State.

Forest Service Notes

Some Effects of Fire on Slash and Longleaf Pine Areas

The effects of two severe fires that occurred in south- rn Georgia in the spring of 1927, each covering several housand acres of cut-over pine lands, were studied by resters of the Southern Forest Experiment Station in pril, 1928. On a slash pine area where the 1927 fire ad been preceded by periodic burning, no living pine eproduction whatever was found. On an area that ad been successfully protected from fire for 7 years rior to 1927, most of the slash pine seedlings over 12 eet in height and 6 or 7 years old have been able to urvive and a considerable proportion of the younger rees, also, have lived through the fire and the year folowing it. On this area there remains as a nucleus for nother crop of trees an average of 366 young slash ines per acre, averaging about 10 feet in height.

The remarkable fire-resistant powers of healthy, fastrowing longleaf pine stands that have attained diamters of more than 2 inches is attested by the results of his study. In open-grown pole stands of longleaf no vidence was found of the killing of any of the trees anging from 4 to 8 inches in diameter.

In slash pine on poorly drained sites that had not een burned for seven years prior to 1927, 78 per cent f the turpentined and 48 per cent of the round trees inches and more in diameter were killed. In longeaf pine, on better drained sites, that had not been urned for about two years the losses included 56 per ent of the turpentined and 32 per cent of the round rees of this size. In longleaf that had previously been urned periodically the trees 8 inches and more in iameter, all of which had been turpentined, were all illed.

Crawlers Used Successfully on Fire Lines in Arizona and New Mexico

Tractors of crawler type have proved their value as re-line builders on the national forests of Arizona and New Mexico. On ground with a slope of not more han 15 per cent, two or more fair-sized logs are hooked o the tractor and pulled along the course of the proosed fire line. If time permits the tractor is whipped rom side to side to break up the ground. The logs hen open out a fairly wide and clean line that a few nen can rapidly work into a good fire line. On slopes f more than 15 per cent the tractor is whipped from ide to side to clear the line without the help of the logs. On steep slopes logs will not follow the tractor if the ine is run across the slope. The tractors are now quipped with lights for use at night.

Fire Characteristics Related to Forest Cover Type

Characteristics of forest fires differ according to the forest types in which the fires occur, according to analyses by S. B. Show and E. I. Kotok of reports on individual fires on the national forests of California. The fuels in one forest type differ markedly from those in other types, and the various climatic and topographic factors that are responsible for the type also influence in no small measure the rate of spread of fires and the difficulty of their control.

In the chaparral and brush types, Show and Kotok found, incendiary fires are much more common than in other forest types. Here the length of the fire season is five and two-thirds months, as compared with only four months in the fir type, and fires are much harder to control. In the chaparral a going fire covers fifty times as much area in an hour as in pure fir, the type in which suppression is easiest. These facts in themselves indicate the possibility that types may furnish a valuable guide for allotting fire-suppression funds and distributing fire guards and lookouts.

The western yellow pine type, with high values both present and potential, is indicated by these studies as the type most needing additional protection to insure profitable timber production. The measure indicated as perhaps most needed at the present time by the California forests is the protection of the restocking brushfields found in all the timber types.

Wilderness Areas in the Rocky Mountain District

In the Rocky Mountain National Forest District 42 separate tracts of national forest land have recently been set aside as "wilderness" areas. These areas have been selected as lands in which natural forest conditions should be preserved, either for scientific or for recreational purposes. In 13 small areas on the national forests of Colorado, Wyoming, and South Dakota all forms of commercial or recreational use are prohibited, in order to provide opportunity for scientific observation and research. One wild, inaccessible area of 100,000 acres on the Washakie National Forest, Wyo., is closed to commercial use and dedicated to recreation. The remaining 28 areas, comprising 2,451,020 acres in Colorado, Wyoming, South Dakota, and Minnesota, will be kept in a wild state in the sense that they will not be developed by road building or opened to occupancy under permit. They will, however, be subjected to grazing and to timber cutting.

Fertilizer Value of Norway Pine and Jack Pine Litter

A field study of the value of forest leaf litter in pine forests of the Lake States conducted by the Lake States Forest Experiment Station at Cloquet and Cass Lake, Minn., which was reported in the FOREST WORKER of March, 1927, has now been completed. In this study burlap strips were laid on the ground in five different localities in Norway-pine and jack-pine stands of different ages and densities, and the accumulated leaf litter was collected from these strips annually.

On the basis of the average accumulation on these plots it appears that a year's fall of litter on 1 acre of pine forest in the Lake States could be stuffed into 200 burlap bags about 2 by 4 feet in size. In pure Norway-pine stands the bulk is somewhat greater than in pure jack pine. The yearly fall per acre was found on the average to weigh 2,257 pounds when air dry, or 2,100 pounds when oven dried (at 100° C.). The total fall of litter for all five plots in 1927 differed by only 1 per cent from that of 1926, on the basis of oven-dry weight. Individual plots, however, showed as much difference from year to year in the weight of litter accumulation as was shown between plots of different species for a given year, the variation being about 15 per cent. Exceptions were the plots in pure jack-pine forest, in which the accumulation varied little from year to year. The lack of uniformity in distribution of needle litter over the forest floor is illustrated in this study by the fact that a consistent variation appeared from year to year in the amount of litter caught on the various plots. In one case the annual catch on plots 200 feet apart differed by 50 per cent in both 1926 and 1927. This difference indicates the necessity of getting adequate samples.

On a plot in a Norway-jack pine stand it was found that the litter accumulated between the middle of June and the middle of October, 1926, weighed as much as that which accumulated during the remainder of the year. In a pure Norway-pine stand the accumulation during these four months was almost five times as great as that of the remainder of the year.

In order to estimate the amount of water that leaf litter will absorb, a portion of Norway-jack pine litter was soaked in water for two days. After the loose water was shaken off it, the litter was found to weigh 156 per cent more than when it was oven dry. Thus a ton of litter oven dried can hold 1½ tons of water by pure absorption. This means that in forests such as those in which this study was made, the average needle fall for a year can absorb within itself a rainfall of about 0.014 inch. Moreover, in addition to the water that soaks into the needles themselves, much water is held by the litter lying on the forest floor that drains away from the litter when it is picked up. Also, in considering the water-holding capacity of forest litter in place on the forest floor one ordinarily is dealing with the accumulation of a number of years.

According to analysis of the samples collected in this study, the annual accumulation of litter on 1 acre of the forest floor in the pine forests studied contains chemical elements in the following amounts: Nitrogen 8 to 16.5 pounds; calcium, 9.9 to 21 pounds; phosphorus, 2.1 to 3.5 pounds; potassium, 2.6 to 3.5 pounds; and sulphur, 5.6 to 6.7 pounds.

On the strength of the chemical analysis of the litter Doctor Alway, head of the Division of Soils in the University of Minnesota, has computed that the nitrogen content alone in the leaf litter amounts on the average to 15 pounds per acre. Soils similar to that on which the leaf litter was collected would produce, with liming, somewhat more than 2 tons of alfalfa hay per acre per year. This would carry about 100 pounds of nitrogen. From one-sixth to one-eighth of an acre of alfalfa, therefore, collects from the air just about as much nitrogen as is contained in the leaf litter deposited each year on one acre of the forest floor. In unburned forest there is present an accumulation of litter from three or four years. Therefore fire that destroys the accumulation of leaf litter robs the soil of from 45 to 60 pounds of nitrogen, to replace which would require the application of from $9 to $13 worth of sodium nitrate per year.

Do Understocked Stands Ever Catch Up?

N. W. Hosley, forest assistant on the Harvard Forest has transmitted to the FOREST WORKER the comments of Yrjö Ilvessalo on Donald Bruce's article in the January number of the WORKER, Do Understocked Stands Ever Catch Up? In this article Bruce questioned the theory, commonly held by foresters, that understocked stands approach normality. In so doing he cited tables given in Professor Ilvessalo's book, "The Forests of Finland," that compare actual and normal volume and annual growth of stands in given age classes in southern Finland, and pointed out that these tables offer no evidence in support of the theory Bruce was careful to explain that some factor unknown to him might make these tables inapplicable to this argument. Professor Ilvessalo states that this is the case; that the Finnish forests whose volume and growth form the basis for these tables have not been allowed to develop naturally but have been subjected to extensive thinnings and fellings.

Bruce remarks:

> Professor Ilvessalo's comment on the effect of thinnings is, of course entirely pertinent, and it was the realization that there were doubtless factors of this sort involved that made me word my comment on his tables so cautiously. I merely said that there seemed to be no evidence there in favor of the approach theory. I was led to call attention to this fact because this theory has been so widely accepted on purely theoretical grounds and because so little evidence in favor of it has been published. If my article stimulates search for it, I shall be more than satisfied.

National Forest Receipts

National forest receipts mounted in the year ending June 30, 1928, adding $274,829 to the receipts of the preceding year to make a total of $5,441,434. Timber sales brought in $3,262,525; livestock grazing fees, $1,694,273; permits for special uses of land included in the forests, $285,684; and water power permits, $101,797.

The share of national forest receipts turned back by the Federal Government to the counties in which the forests are situated, for roads and schools, amounted for the past fiscal year to $1,387,249.

Improved Market for Alaska Hemlock Logs

By J. M. Wyckoff, United States Forest Service

Heretofore the sawmills of southeastern Alaska have demanded logging chances with a minimum of hemlock, and the Forest Service has found it difficult to obtain the desired utilization of hemlock of saw-timber size. In 1927, however, two of the largest mills secured contracts from the Alaska Railroad for sawn hemlock ties. The operators of these mills were willing to go into stands with as much as 20 per cent hemlock. In 1928 the tie market improved, and sales were made on areas cruising 35 per cent hemlock. In addition to the sales for ties, an order has recently been placed with the Ketchikan Spruce Mills calling for 800,000 feet board measure of hemlock timber for flume construction in Alaska. This order includes more than 200,000 feet board measure of timber 6 by 16 inches by 16 feet. As a result of this order one sale of 500,000 feet has been made that will cut 75 per cent hemlock. A raft of 250,000 feet of timber from this sale cut 20 per cent 6 by 12 inch, 12 by 12 inch, and 6 by 16 inch lengths of from 16 to 32 feet.

The Tongass National Forest has carried on a persistent campaign to open a market for hemlock lumber, and it appears that these efforts are about to bear fruit. The loggers and sawmill owners are sold on the merits of Alaska-grown hemlock and are cooperating closely with the Forest Service in advancing the market for this product.

Huron National Forest Created

A presidential proclamation of July 30 created the Huron National Forest, in Crawford, Oscoda, Iosco, and Alcona Counties, Mich. The new forest includes some land formerly comprised by the Michigan National Forest. Its gross area is 500,000 acres. Of this total about 200,000 acres are now Government property. The National Forest Reservation Commission has authorized acquisition by the Department of Agriculture of the privately owned lands within the newly defined boundary.

Mogollon Working Circle in Arizona Tapped

The most recent of the saw-timber working circles in northern Arizona to be made accessible, the Mogollon working circle on the Sitgreaves National Forest, has just been tapped with a standard gauge railroad 19 miles long. The railroad connects the Arizona towns of Standard and Snowflake. Snowflake is located on the Apache Railway, a common carrier. At Standard the Standard Lumber Mills (Inc.) has nearly completed the rebuilding of a single band resaw mill at which will be milled the 30,000,000 feet of timber to be cut annually from the Mogollon working circle. The operation will be on a sustained yield basis and it is expected that the present mature stand of 2,250,000,000 feet to be removed will be completely logged out during the first cutting cycle, which has been placed at 75 years.

Lodgepole Pine, Aspen, and California Red Fir Tested for Boxes

The Forest Products Laboratory has been testing some of the little-used timber species as material for packing boxes. Boxes of lodgepole pine, aspen, and California red fir when subjected to various storage conditions and changes in moisture content gave results very similar to those obtained with western yellow pine boxes of the same design. A lower rating was earned by western larch, and still less favorable results were shown by white fir, silver fir, western hemlock, and lowland white fir.

It was found that boxes made from green lumber and allowed to dry are likely to show only one-half to one-fourth as much resistance to rough handling as boxes made of dry lumber and stored under the same conditions. For the most satisfactory results boxes should be nailed up at a moisture content only slightly above that of equilibrium conditions of service.

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Air patrol of the national forests of Idaho, western Montana, Washington, Oregon, and California during the 1928 fire season was contracted to commercial flying organizations. At a charge of $30 to $50 per hour of flying these organizations undertook to fly patrols on request of forest supervisors either to detect or to scout fires.

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The Lee National Forest, on the Camp Lee Military Reservation in Virginia, has been abolished. Other military national forests recently abolished are the Jackson, on the Camp Jackson Military Reservation in South Carolina, and the McClellan, on the Camp McClellan Military Reservation, Ala.

A Study of Acorns and Oak Seedlings

In studying problems connected with the germination of acorns and early survival of oak seedlings C. F. Korstian, of the Appalachian Forest Experiment Station, found evidence that for many oaks the bearing of acorns is without profit so far as reproduction is concerned. Doctor Korstian's studies, which were conducted in Buncombe and Haywood Counties, N. C., and in New Haven County Conn., showed that in many cases from 90 to 100 per cent of the available supply of acorns may be eaten by rodents and other animals. Many acorns, also, fail to germinate because of injury by insects, the principal insect offenders being nut weevils.

Whether the acorn that escapes destruction by animal or insect retains the power to germinate depends partly upon the amount of moisture it is able to retain. Red oak acorns are slightly drier than those of the white oak, the normal moisture content of the embryo being from 50 to 60 per cent of total weight for the former and from 60 to 70 per cent of total weight for the latter species. Viability of acorns is largely decreased if their moisture content falls to between 30 and 20 per cent and is completely lost if it falls to between 15 and 10 per cent. Proper storage conditions, whether natural or artificial, provide sufficient atmospheric or soil moisture to maintain the general high level of water content in the seeds, and at the same time provide enough oxygen for the respiration of the moist acorns.

The most favorable storage temperature, in general, averages 50° F. at night and 65° F. in the daytime. Below 40° F. germination does not occur, and temperatures averaging 80° F. at night and 95° F. during the day affect germination unfavorably.

Germination is somewhat delayed in the black-oak group, the seeds of which are more fatty than those of the white-oak group. An increase in temperature within the vital range tends to shorten the rest period, but is not alone sufficient to terminate it. The need of acorns of this species for a rest period and for high temperatures to hasten after-ripening is believed to be associated with enzyme activity, particularly with reference to the conversion of fats into carbohydrates.

Forest fires usually destroy the viability of acorns lying under the leaf litter. Red oak acorns resist high temperature more successfully than those of other species. The other groups rank in order of decreasing resistance as follows: chestnut, black, scarlet, and white. In the case of oaks as of many other trees, the larger seeds give a better percentage of germination and more vigorous seedlings than the smaller seeds.

Compactness of the surface soil is an important factor in the ability of oak seedlings to take root. According to the results of measurements with a penetrometer and studies of the ability of the oak radicles to penetrate the substratum, it appears that the seedlings can not take root if the penetrability of the surface layer lies at a point somewhere between 0.01 an 0.023 millimeter per gram of load applied.

Leaf litter has a part of the greatest importance i producing an environment suitable to the germinatio of acorns and the survival of oak seedlings, because i stabilizes the moisture and temperature conditions an prevents the surface soil from becoming so compa that the seedlings' roots can not penetrate it.

Results of a Test Planting in Idaho

On the experimental forest of the Northern Rock Mountain Forest Experiment Station near Pries River, Idaho, test plantations were established fro 1911 to 1917 with western yellow pine seed from 1 different localities in the Western States. There ar 21 plots, each 50 feet square and originally plante with 100 transplants except for 4 that are half tha size and were planted with 50 transplants each. The represent nine climatic units within the natural rang of this species: The southern Rocky Mountain regio the Siskiyou-Shasta region, the Blue Mountains northeastern Oregon, the Salmon River Mountains i southern Idaho, the east slope of the central Rock Mountains, the Black Hills region, the west slope the northern Rocky Mountains, the Uintah Range northern Utah, and central Montana. The site is rather dry, flat, and uniform glacial outwash of dee fine sand and interspersed gravel lying at an elevatio of 2,400 feet. Sixteen years of weather observatio made near by show that the air temperature ma range in a year from −30° to 100° F., and tha the mean is about 43° F. According to the mos closely applicable weather records available, it appea that this mean is well below the average mean annu temperature of the localities from which seed we brought for the experimental plantings. The annu precipitation on the planting site has varied from 24 t 41 inches but is normally about 30 inches.

In the fall of 1927 Gerhard Kempff, then of th Northern Rocky Mountain Forest Experiment Statio examined these plantations and recorded observatio as to survival, height growth, vigor, and frost resistanc of the trees. The results of this examination set o the localities of origin into two general division separated geographically by a line running approx mately east and west through the southern Black Hil and through the central Blue Mountains just south the Umatilla Forest, Oreg. The northern divisio embracing the site of the experimental plantation embraces also the seed sources of the 10 plots that we rated highest. Mean annual temperatures for a these sources are strikingly similar, Mr. Kemp observes, and their extremes of temperature a broadly comparable. Precipitation, on the other han varies considerably among these various sources of th seed with which the best results were obtained a Priest River. Between some of them the annual mea differs by as much as 100 per cent.

Seed Bed Density

For several years experiments were carried on by W. G. Wahlenberg, then of the Northern Rocky Mountain Forest Experiment Station, to determine the density at which seed of various tree species should be sown to produce the most desirable planting stock. Working at the Savenac Forest Nursery in western Montana with seed-bed densities varying approximately from 80 to 260 seedlings per square foot, he found that the diameter of 1-year-old seedlings of western yellow pine decreased one-tenth millimeter for each increase of about 44 trees per square foot. The height growth of 1–2 transplants in the nursery decreased one-tenth inch for each increase of about 24 seedlings per square foot in the seed beds, and the number of main rootlets on 3–0 stock decreased by 1 for each increase of about 22 seedlings per square foot. The percentage of distinctly inferior 2-year-old plants increased by 1 for every increase of about 27 trees per square foot. Slight as these differences may seem, they apparently had an effect upon the field survival of 2–0 stock; two years after planting, survival was 1 per cent lower for each increase of about 27 trees per square foot in the original seed bed. Height growth of field-planted stock, also, decreased with an increase in seed-bed density.

Western white pine 2–0 stock grown in dense stands were much smaller, more slender, and slightly taller, and had fewer lateral rootlets than those that were given more room. Field survival was distinctly higher for trees grown at densities of less than 210 seedlings per square foot in the seed beds.

With 3–0 Engelmann spruce ranging in density from 116 to 323 seedlings per square foot in the seed beds, increases in density were accompanied by decreases in characteristics desirable in planting stock. Stems were shorter and more slender, needles were shorter, and tops and roots weighed less. These features of general development overshadowed the advantage from an increase in the proportion of total plant weight contained in roots of densely grown plants.

In spruce seed beds at Savenac frost nipping decreased with increases in density, but in relation to the more severe damage from frost heaving the advantage worked in the opposite direction. Frost heaving of 2–1 spruce in transplant rows and 3–0 spruce in field plantations increased with the density at which the trees were grown in the seed beds. With decreases in the density of seed beds the field plantations showed a tendency toward increased survival and growth.

For the best development of seedlings at Savenac, Mr. Wahlenberg concluded, there should be less than eighty 2-year-old western yellow pine, less than one hundred and sixty 2-year-old western white pine, or less than one hundred and twenty 3-year-old Engelmann spruce per square foot of seed-bed surface.

Forage Plant Seed Sown on the Manti National Forest

On parts of the Manti National Forest, in the Wasatch Mountains in central Utah, where growing conditions are favorable, an effort is being made to reseed depleted range areas with desirable forage plants. In 1924 an acre of fenced ground at the Bear Creek Ranger Station was sown to smooth brome grass, and each year since then the forest rangers have been sowing depleted range areas on the forest with seed harvested on this plot. In order to speed up the work, the forest supervisor and the stock associations wrote to stock owners and herders on the forest suggesting that in connection with their regular work they collect seed of the valuable forage plants on and near their allotments. Suggestions on reseeding practices were given to the stockmen by the rangers. Some of the stockmen now collect a pocketful of seed from time to time, some strip sackfuls of ripened seed from the plants, and some are collecting seed of palatable plants at considerable distances from their allotments and even on other forests.

Certain herders on the Manti have been collecting and sowing seed for several years. The Cottonwood Creek Cattle and Horse Association in 1924 sowed 200 pounds of yellow clover seed furnished by the county agent of Emery County. The seed was distributed by the riders as they made the second fall ride. On part of the area covered an excellent stand of yellow clover was established by 1927. Through cooperation of the Twelve Mile Cattle and Horse Association, sowing of some 40 or 50 acres of denuded range in Clear Creek Flats was undertaken last year. Wheat grass from the steppes of Russia and a mixture of alfalfa, timothy, alsike, and dutch clovers were sown in May, 1927, and late in the fall adjoining areas were sown with rye and with the smooth and native brome grasses. It was expected that the rye, besides furnishing forage for one season, would perhaps act as a nurse crop for the brome grasses.

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Sixteen-year-old seed of western yellow pine showed a viability of 88 per cent in germination tests recently made by W. H. Schrader, in charge of the Monument Nursery on the Pike National Forest, Colo. The seed, collected on the Cochetopa National Forest, Colo., in 1911, were water cleaned in 1916, but were not treated in any way from that time until they were tested in the spring of 1928. The seed were kept in an unheated seed room in unsealed cans.

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The name of the Minnesota National Forest, Minn., has been changed by Executive order to Chippewa National Forest.

Planting Stock Unhurt by Storage

Planting stock taken from seed beds of the Wind River Nursery, Columbia National Forest, Wash., in the spring of 1927 reached the field in good condition after being stored in the cellar of the nursery as long as 32 days. It is the practice of the nurserymen to keep bundles of stock in storage in order that shipments may be made on short notice. The low temperature of the storage cellar keeps the stock from drying out and holds the buds dormant.

In the spring of 1927 each bale of trees stored in the cellar was given a number and records were kept of the dates on which each bale was placed in the cellar and shipped and of its weight at those times. Position in the pile was noted, and frequent measurements were made of the temperature within bundles. Lots held in storage more than 20 days were resoaked by upending the bales and squirting water in the ends with a hose from 1 to 16 days before shipping. This was done as a precaution rather than because of any direct evidence that the trees were in need of water.

In lots held in storage from 1 to 15 days the average loss of weight per bale ranged from 5.2 pounds to 11.4 pounds. Loss of weight showed very little variation with length of storage, depending in a greater degree on how wet the packing material was when the bundles were made up. The main loss in weight was the run-off of surplus moisture from the packing material the first day. One lot lost an average of 8 pounds per bale in one day's storage. On the average the bales packed in moss lost 1.73 pounds more than those packed in shingle tow, probably owing to the fact that moss absorbs more water at the start.

At no time were temperatures within the bales found to be more than 2° higher than the cellar temperature. The latter varied very little from 40° F.

Position in the pile appeared to make no difference in loss of weight, the extra pressure on the bottom tiers of bales being compensated for by the additional circulation of air around the top tiers.

In all cases the different shipments of stock reached the field in good condition.

Raw Humus

By R. F. Taylor, United States Forest Service

In the cold, humid climate of southeastern Alaska, coniferous forests accumulate an immense amount of litter composed of needles, cones, bark, dead wood, and twigs. Because it does not decay rapidly, this litter soon forms a dense mat of raw humus, in some places more than 6 inches deep. The humus layer is thickest and toughest in the poorly drained semimuskeg areas, but is by no means entirely absent from the younger stands of second growth. Throughout the region the forest soils underlying the layers of humus and litter are, except for certain limestone areas, exceedingly acid, varying from 4.6 pH. to more than 3.8 pH.

If the layer of raw humus formed only after the forest reached maturity, we should have no quarrel with nature, for clear cutting would bring decomposition and more suitable soil conditions for reproduction. It appears, however, to be seriously affecting the growth of immature stands.

To get some idea of the actual effect of the dense mat of tough, undecomposed, acid humus upon the growth of young even-aged hemlock-spruce stands, a half-acre plot was measured off in a stand where the layer of raw humus was more than 6 inches thick, measurements were taken of the trees growing on the plot, and these were compared with average figures for nine plots on better-drained soil but a few chains distant in stands of the same age and origin. The area with raw humus was almost level. Moss was grown through the litter, forming a thick mat of undecayed material. The humus gave way sharply to a mottled gray clay, and the underlying strata were greenstone and schists. On the better-drained land the litter layer was thin and unmatted and merged into a humus layer, which in turn merged into a dark, well aerated loam. The underlying strata were the same. The measurements, on an acre basis, were as follows:

	Basal area (sq. ft.)	Number of trees 1 inch and over in diameter	Average dominant spruce		Average dominant hemlock		pH value	Age (yrs.)
			Diameter at breast height (ins.)	Height (feet)	Diameter at breast height (ins.)	Height (feet)		
Normal humus	303	358	17.8	112	16.1	103	4.2	73
Raw humus	299	808	12.7	97	13.2	89.5	3.8−	73

This is but a tiny illustration of the important rôle of the soil conditions in young stands. Investigations in this highly interesting field should prove enlightening. The farmer's first consideration in growing agricultural crops is the soil. Why not in growing timber crops?

New Zealand Woods Make Good Newsprint

Good newsprint paper can be made from New Zealand woods, according to the results of tests made at the United States Forest Products Laboratory on two carloads of logs sent to this country a year ago by the New Zealand Forest Service. The final test was the production of several tons of newsprint and rotogravure papers at two Wisconsin mills and the running of the newsprint paper over the presses of a daily newspaper.

The woods included in the tests are rimu, a native softwood; tawa, a native hardwood unsuited to the production of lumber; and four introduced species, Monterey pine (*Pinus radiata*), European larch, Austrian pine, and Corsican pine. For the purposes of the pulping trials the two native New Zealand woods and the Monterey pine were considered the most important.

A satisfactory newsprint was produced from mixtures of tawa groundwood (produced in a strictly mechanical manner on a pulpstone) and tawa sulphite (chemical) pulp with Monterey pine sulphite. Reversing the usual 3 to 1 ratio of groundwood to sulphite pulp (normally added to newsprint to give strength), the laboratory found that a highly satisfactory newsprint sheet could be produced from a mixture of 50 per cent tawa sulphite, 35 per cent tawa groundwood, and 15 per cent Monterey pine sulphite. Indications were found, also, that in this process bleached rimu and European larch might be added or substituted.

Satisfactory kraft pulps were produced from the New Zealand-grown pines and larch, and bleached pulps suitable for book paper and similar products were produced from tawa by the soda and sulphite processes and from Monterey pine by the sulphite process.

These results may mean profitable utilization of thinnings from the 100,000 acres of fast-growing planted forests in New Zealand that have now arrived at thinning age. They may also mean the freeing of New Zealand from the necessity for importing newsprint. At present New Zealand buys newsprint from Canada and from England.

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Correction.—Headquarters of the Cherokee National Forest have been moved to the Federal Building, Athens, Tenn. In the July number of the FOREST WORKER the new location was erroneously given as Athens, Ga.

General Forest News

Insects as Indicators of Fire Injury

By R. A. ST. GEORGE, United States Bureau of Entomology

The predilection of certain bark beetles and borers for freshly killed or dying trees often affords a practical guide for estimating the effects of forest fires. Attack by these insects on trees injured by fire makes it possible to predict with a considerable degree of certainty that the trees are not going to survive, many months earlier than this could be done in any other way. For this reason it is highly desirable from the forester's standpoint to know the significance of the presence of certain insects that follow fires, and their characteristic modes of attack.

The ambrosia beetles are probably the insects that attack fire-killed timber, both hardwoods and conifers, earliest and in the greatest numbers. Their attack is easily recognizable. Small pinholes extend into the wood, from which often project short tubular columns of white frass. At other times whitish powder or very fine particles of wood fiber may be noticed on the bark or around the base of the tree just below the holes. These beetles attack only moist dead wood, and when their tunnels are found associated with fire injury it is a sure sign that the portion of the tree in which their galleries are extended has been killed. If their entrance holes extend completely around the base of the tree, the tree will not recover.

Certain wood borers commonly known as pine sawyers likewise attack recently killed pine, spruce, and fir. Their attack is conspicuous and is easily recognizable by the oval pits or egg scars (one-fourth to one-half inch in diameter) that they gnaw into the bark. A slit in the bottom of these pits serves as an opening through which the eggs are inserted in the inner bark. These beetles work only in dying and dead trees. The presence of these pits, therefore, furnishes absolute evidence that the tree is dead or will not recover, even though the foliage is green.

Species of Ips, or the bark engravers, are still another group associated with dying or weakened trees. Their attack is less conspicuous; usually the bark must be removed to make certain of their presence. Occasionally pitch tubes or brownish boring dust on the bark serves as an indication of their attack. Normally these species breed in dying or felled trees. Their presence, especially long after a fire, nearly always means that the tree is dead or dying, even though the foliage may still be green, and that the injury can be attributed to fire rather than to insects. An examination of the inner bark usually reveals patches or streaks of yellow-brown discoloration. It is only occasionally and under unusual conditions that these beetles are present in sufficient numbers to attack and kill green trees.

Other insect species such as the tree-killing Dendroctonus and certain borers are associated with fire-killed timber, but the significance of their attack is often more difficult to interpret.

Photographs showing characteristic attack of ambrosia beetles and pine sawyers will be furnished on request by the Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

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The Tucson, Ariz., biological investigations field office of the Bureau of Biological Survey, of which Dr. Walter P. Taylor is in charge, has moved to new quarters at the University of Arizona, in Tucson.

Neighborly Accommodation as a Fire Prevention Measure

How generosity can prevent forest fires has been proved by the Pfister-Vogel Co. on its 65,000 acres of forest land in Union County, Ga., according to a story by F. H. Abbott in the June number of Georgia, the monthly magazine of the Georgia Association. On this land the company has erected six lookout towers and maintains a fire-protection system that costs 2 cents per acre per year. But in explaining how the proportion of the total area that is burned over each year has been reduced during its occupancy from 60 per cent to less than one-tenth of 1 per cent, the company gives credit to the excellent cooperation it has won from the mountain folk whose homes are scattered over its widespread holdings. The company's dealings with these people have for many years been directed by Bonnell H. Stone. In 1917 the company sent every taxpayer in Union and adjacent counties a letter offering free use of the range land on its property. The citizens were invited to use the 55,000 acres of range as if it were their own, on the one condition that they must not burn the woods. To-day, Mr. Abbott writes, "fences built at the expense of local citizens and the company thread the mountain sides and valleys from end to end, separating forest and agricultural land, providing great free community pastures." The use of the 100-mile telephone line that connects the company's fire towers is given free of charge to the mountain people, not only in emergencies but as a general practice. The mountaineers respond to this neighborly treatment with care in the use of fire and with help in detecting and fighting forest fires. In addition to the low annual fire score, Mr. Abbott tells us, evidence of the success of the policy is the fact that in all the years since it was announced not a strand of the company's wire has been cut and none of its equipment or property has been lost by theft.

Michigan Kiwanis Underwrites Big Plantation

"Michigan Kiwanis Forest Plantation" is the new name of a 5,000-acre tract on the Huron National Forest located near East Tawas, Mich. To pay for the labor that planted trees on this tract Kiwanis clubs of the State subscribed $9,700. The Forest Service supplied the trees and the tools, and forest officers directed the planting. Dedicatory exercises, and a picnic on the forest, were planned for September 21. Each Kiwanian attending the dedication was expected to plant a tree along the Thompson Memorial Highway.

Next year the organization hopes to add 5,000 acres to the plantation.

A Device to Prevent Edger Kick-Backs

A device for preventing kick-backs on the edger, a source of many serious injuries to employees, has been perfected by R. F. Buckley, saw filer in the Sumrall, Miss., planing mill of the J. J. Newman Lumber Co. Fingers of high-grade steel suspended from a shaft which is fastened to the top of the edger frame by an I-beam hang down behind the back feed rolls. These fingers are half an inch apart to prevent binding and a spring on the shaft permits adjustment so they will not peck smaller boards that follow cants through the edger. The fingers are slightly curved inward and downward. Any piece passing through the edger pushes the fingers up so that they ride it as it goes through and act as a positive "dog" to prevent either edgings or timber from being shot through the front of the machine by the pressure of the saws. The location at the back of the edger prevents the device from obstructing the edgerman's view, as is the case with many other safety devices, or in any way interfering with the operation of the edger.

Great Quantities of Walnut Burl from New Mexico Ranches

On ranches on the Ruidoso and Bonito Creeks, within the borders of the Lincoln National Forest, N. Mex., Mr. Noel Insall has cut 201,000 pounds of walnut burl. This burl has been bought from the ranch owners for $3 or more per tree. With the exception of 10,000 pounds sold to the Pullman Co., of Chicago, to be used for interior furnishings of Pullman cars, it has all been shipped to England and France. A single tree in the Ruidoso district of the forest contained 12,970 pounds of merchantable burl. In this tree the bu[illegible] extended almost to the top and 8 feet into the ground To cut it up and load the wood on trucks was nine days' work for five men.

The Boots of Tourists Injure Mariposa Big Trees

Heavy and long-continued tramping of human feet has destroyed the root endings and finer roots of many of the sequoias in the Big Tree grove of Mariposa County, Calif., Dr. E. P. Meinecke, pathologist of the Bureau of Plant Industry, concluded after investigating the present condition of the trees at the reques of the National Park Service. Thus damaged, the trees are unable to absorb water and mineral nutrient from the soil. Grizzly Giant, one of the finest Big Trees in existence, was found to be similarly affected about 25 years ago. This tree was restored to health by loosening the soil surrounding it and placing additional soil around the tree and over the roots to a heigh of 3 or 4 feet.

Successful Fire Protection on a Georgia Turpentine Operation

A fire protection experiment is being carried out in southern Georgia by H. M. Wilson, vice president of the Baldwin-Lewis-Pace Co., Jacksonville, Fla., in connection with a naval stores operation in Clinch and Lanier Counties, near Stockton, Ga. This operation, of from 15 to 17 crops, covers about 7,500 acres of land. The protection system covers 15,000 acres. Fire lines have been formed by plowing furrows 30 to 40 feet apart, with tractor and disk plow, and burning the intervening strip. Mr. Wilson finds that lines can be constructed in this way at a cost of from $6 to $8 a mile. Eight or ten 5-gallon water tanks, with hand pump and short hose, have been provided. These are carried on the back and are used to spray grass fires so that men with pine tops and brushes can go close enough to a fire to beat it out. They are convenient also for extinguishing fire on stumps and snags. To refill these tanks four or five 50-gallon drums full of water are kept ready. A truck is available to transport men and equipment to fires.

In the first 18 months of the operation of this system, which included two winter seasons, its cost to Mr. Wilson, exclusive of amounts refunded to him by the Federal and State Governments under a cooperative agreement, was $2,585. In the same time he saved $2,400 by omitting to rake his turpentined trees. As a result of the net outlay of $185, Mr. Wilson reports, hundreds of thousands of young pines are growing where two years ago there were none.

Pennsylvania School Children Detect Spread of Blister Rust

By enlisting the help of Pennsylvania school children in a search for white pine blister rust, the Bureau of Plant Industry has discovered the disease in 37 counties of the State. Prior to 1927 the scattered findings of the blister rust in Pennsylvania had been confined to the northeastern counties. In that year it was requested that children in the public schools of the State be asked to examine the currant and gooseberry leaves in their own and neighbors' yards. Colored pictures of leaves affected with the blister rust were provided, and the children were asked to collect any leaves that they thought resembled the pictures and to send the specimens, through their teachers, to the Pennsylvania Department of Agriculture. Schools in 53 of the 57 counties invited to cooperate did so. Children in 1,761 schools examined 13,061 gardens and sent in 465 envelopes of specimens that were identified as affected with the blister rust.

The area in which the disease was found extends nearly to the Ohio border on the west, and on the south to the Maryland line.

Water Conservation and Timber Growing at Urania

In the country surrounding Urania, La., writes Henry E. Hardtner, it is impossible to get good water from wells, whether shallow or deep. The Strickland spring, in the southeast quarter of section 6, township 10, range 1, 30 years ago was the main dependence of many families. Section 6 and sections 5 and 8 have a sandy clay soil that is good pine land, and at that time were covered with a dense virgin forest of longleaf pine. In the period 1898–1905 the timber was cut clean. Within a short time the spring was of little service, going dry periodically. In 1910 Mr. Hardtner began reforesting the denuded lands, and by 1915 these lands were occupied by a complete stand of young trees. Since then the spring has come back. It now furnishes more water than ever before, and never fails even in periods of severest drought.

On 28,000 acres of land at Urania, Mr. Hardtner is carrying out the oldest reforestation contract in Louisiana. The area includes 10,000 acres of cut-over longleaf pine land, 15,000 acres of brush woods (loblolly), and 3,000 acres of swamp lands. The logging of this land was begun in 1890. Mr. Hardtner began sawmilling on it in 1896 and completed the cutting of the merchantable timber in 1913. It was in 1913 that he contracted with the State to devote the land for a period of 40 years to experimental timber growing, the State agreeing that the assessment on the property should remain constant during that period. A 6 per cent severance tax will be levied when the new growth of timber is cut.

Many experimental plots have been established on this land, especially for study of rate of tree growth. The work has attracted much interest on the part of foresters, and for years each class graduated from the Yale Forest School has been brought to the Urania Forest for its spring camp work. Fire prevention has been practiced with a high degree of success, all bare areas have been reforested, and thinnings have been begun. Mr. Hardtner estimates that during the 15 years that the contract has been in effect he has cut from the area $6,000 worth of timber and has spent $25,000 in caring for the forest.

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The Michigan-California Lumber Co. has announced that all its future operations will be on a sustained production basis. With the assistance of the research department of the Western Forestry and Conservation Association the company has estimated that the rate of growth of the timber on its 16,000 acres of cut-over land averages about 400 board feet per acre per year. The company's property includes 62,000 acres of virgin timber.

Coated Match Stems Lessen Fire Danger

A match that burns only so far as useful purposes require, going out automatically with part of its stem still unconsumed, is a recent fire-prevention suggestion from P. D. Sale, of the United States Bureau of Standards. Mr. Sale, whose experiments with F. M. Hoffheins to show the fire hazard involved in burning cigar and cigarette butts were described in the FOREST WORKER of May, 1928, has now carried out a series of tests to determine the extent of the hazard represented by matches that are discarded while still burning.

Tests were made to discover the burning life of four types of match: Swedish safety, American safety, "strike anywhere," and paper book. Half the matches of each of the four kinds used were made noncombustible for part of their length by dipping them in a solution of 60 per cent 1.39 specific gravity sodium silicate (water glass) and 40 per cent water. The protective coating was allowed to extend to a point 1½ centimeters from the tip. Before being used in the tests the matches were all dried at a little above room temperature.

Untreated, the four kinds of matches showed an average burning time of 21.8, 26.6, 32.1, and 34.1 seconds, respectively; treated, they averaged 11, 14.4, 18.6, and 21 seconds.

About 2,000 trials were made in dropping and throwing lighted matches from 3 to 9 feet into a pile of dry grass 2 feet in diameter and 4 inches thick, which was dried before each day's tests so that its moisture content averaged about 5 per cent. The time required to light smoking materials had been determined to be 5 seconds for cigarettes and 10 seconds for cigars and pipes, so after the matches were struck periods of from 5 to 10 seconds were allowed to elapse before they were dropped or thrown. When dropped on the grass pad matches of the four different types having uncoated stems ignited it in 10.8, 22.1, 38.3, and 50 per cent of the cases, whereas those with coated stems ignited it in 14.2, 18.3, 31.6, and 33.7 per cent of the trials. When thrown, uncoated matches caused ignition in 13.3, 15, 33.3, and 61.7 per cent of the instances, while those with coated stems ignited the material in but 4.2, 10.8, 21.7, and 31 per cent of the trials. Thus it would appear that a protective coating on the stem caused a material reduction in the number of ignitions resulting when the lighted matches came in contact with the dried grass pad, especially when instead of being dropped the matches were thrown.

The need and possibility of lessening the hazard from matches discarded while still burning appear on the basis of these tests to be greater for the matches with large wood stems and those with paper stems than for the smaller wood-stem safety matches.

It can be premised with good reason, Mr. Sale points out, that the conditions under which these tests were carried out were more favorable for ignition than the conditions that generally obtain for burning matche that alight in grass, brush, waste paper, and simila materials. If that is the case, under usual condition the probability of ignition is more dependent on th length of stem that is free to burn than it was in th tests, and fire hazards could be reduced by the suggested modification of the match to an even greate degree than is indicated by the results obtained in th tests.

New Fire Pump Designed by Morgan

A new fire pump for use in the woods has been designed by Ralph L. Morgan, of Fitzwilliam Depot N. H. Morgan is an enthusiastic tree-planter and forest protectionist as well as a mechanical engineer. I designing his pump, therefore, he has brought to bea on the problem first-hand experience in both lines o work and has produced a piece of fire equipment tha is light and efficient and carefully planned so as t avoid the drawbacks usually found in commercia pumps. Some of the things Morgan had encountere in his experience with other pumps and that he determined to avoid in his own were "hot boxes, har starting, close-fitted pumps that grind out when gri and sand get into them, lack of power, and smal amounts of water delivered per minute."

As finally perfected, the Morgan pump weighs 35 pounds, is 5 feet long over all, 20¾ inches wide, an 32 inches high from the ground. It is mounted o white-ash runners. The pump is of the centrifuga type with $\frac{3}{16}$-inch clearance, which permits the pumping of sandy or muddy water without injury. It ha a capacity of 250 gallons a minute. Four 1½-inc outlets are provided. The maximum pressure is 18 pounds. Fine steel and duralumin are used extensivel to give strength, reliability, and lightness to the machine. Further details in regard to specifications ca be obtained from the Niagara Motors Corporation Dunkirk, N. Y.

In writing about the pump Mr. Morgan states:

> I am not in this game to make money. A large part of what I ge from the results will go into forestry work here in Richmond [N. H.] I want to make this town a bright, outstanding example of the application of modern forestry to a back town.

Increased Appropriation for Naval Stores Study

Under the agricultural appropriation act for 1929 the Bureau of Chemistry and Soils is allowed $15,000 for "inaugurating studies of new processes and equipment for the production of naval stores, in cooperation with producers and the Forest Service, as well as a study of the adaptability of naval stores for variou uses." This is an increase of $5,000 over the previou appropriation to the bureau for work to promote better producing methods in the naval stores industry.

Squirrels and Blister Rust Cankers

For several years it has been noted that squirrels eat the bark at the cankers caused by blister rust on the twigs, branches, and trunks of the northern white pine. L. E. Newman, State blister rust control leader for New Hampshire, tells of a heavily infected northern white pine area of about 35 or 40 acres in the town of Northwood in which nearly every infected pine had been gnawed by squirrels. In other towns Mr. Newman found similar conditions. Although this activity had resulted in girdling twigs, branches, and stems down to the live wood, not all the diseased tissue had been eaten by the squirrels, for aecia were found fruiting along the edges of the gnawed portions.

An unusual number of gnawed cankers was observed during the past winter. Mr. Newman suggests that this may be explained by the extraordinary mildness of the winter and the lack of heavy snows. A large percentage of the cankers gnawed were at or near the base of the tree—that is, at points generally covered with snow. The mild weather, he believes, encouraged the squirrels to unusually prolonged prowlings.

An interesting conjecture arises as to whether the destruction of so much fruiting area will assist materially in reducing the volume of aecia that otherwise might be spread broadcast by the wind.

Blister Rust Quarantine Modification

Under a revision of the white pine blister rust quarantine effective August 15, 1928, 5-leafed pines may be moved under permit from the New England States and New York into the more lightly infected States east of the Mississippi Valley quarantine line and from Washington into Oregon and Idaho, if the trees have been raised from seed in a nursery free from currant and gooseberry plants and surrounded with a Ribes-free zone. The prohibition of movement from Wisconsin and Minnesota to Michigan, Pennsylvania, and New Jersey is removed. Cultivated red and white and mountain currant and cultivated gooseberry plants may be shipped from infected States without Federal permit and without environs inspection if they have been dipped in lime-sulphur solution of specified strength, maintain the required conditions as to dormancy and defoliation, and are shipped within the prescribed period. No change is made in the quarantine order itself.

The reasons for these modifications are, first, the demonstrated effectiveness of the Ribes-free zone as a permanent protection to 5-leafed pine stands, and proof of the value of the lime-sulphur dip as a measure for the disinfection of currant and gooseberry plants; and second, evidence that the blister rust is now distributed in Michigan, Pennsylvania, and New Jersey to a degree comparable to its prevalence in Wisconsin and Minnesota, so that prohibition of movement of plants between these two groups of States is no longer of value in preventing the spread of infection.

The shipping dates for currant and gooseberry plants are slightly modified as related to dormancy and defoliation, in such a way that it is believed they will correlate more closely with commercial nursery needs as related to climatic conditions without any increase in the danger of dissemination of the rust to new localities.

Among the quarantine requirements retained without material change are those prohibiting the shipment of five-leafed pines from infected to noninfected States, and from the Eastern States to the Rocky Mountain and Pacific coast regions; limiting the interstate movement of European black currant plants to 12 Great Plains and Southern States where five-leafed pines are not economically important; and requiring the use of control-area permits when currant or gooseberry plants are to be shipped into States having legally established blister rust control areas.

Fifteen States are now known to be infected with the white pine blister rust—Connecticut, Idaho, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Vermont, Washington, and Wisconsin. Most of these are carrying on active control measures in cooperation with the Department of Agriculture.

German Foresters Order Douglas Fir Seed by Site

German foresters ordering Douglas fir seed from the Long-Bell Lumber Co. are now enabled to specify from which of five types of site they desire the seed to be taken. In order that the seed supplied for planting in Germany may be of strains adapted to the conditions of the various planting sites J. B. Woods, forester of the Long-Bell Co., in conference with the German Forestry Council and with members representing the various State forest services and forest owners' associations, has evolved for German use a scheme of site classification for the Douglas fir region of the western United States. Frost-free period is considered the dominant site condition. The three other conditions considered are precipitation, soil characteristics, and exposure factors.

The principle of selecting seed on the basis of similarity between site of origin and planting site, which the Long-Bell Co. applies in its own planting work and has thus extended to its German trade, is also followed by the company in supplying seed to Australasia.

* * *

The importation of Christmas trees and greens from the Province of Quebec, Canada, into the United States is no longer banned by the Department of Agriculture. The quarantine was lifted July 1, on the basis of evidence that the gypsy moth has now been eradicated from Quebec.

Selective Logging Indorsed by Lumbermen

Testimony in favor of selective logging was given at the midsummer meeting of the Northern Hemlock & Hardwood Manufacturers' Association, held July 20–21 in Rhinelander, Wis., by lumbermen who have put it into practice. C. A. Goodman, speaking for the Sawyer-Goodman Co., Marinette, Wis., said: "We think we are a little ahead on the proposition, besides perpetuating our operations." This company is taking off its land about 50 per cent of the timber, representing about 70 per cent of the value of the stand. On this basis the company has cut its tie production in half, but despite the reduction in easy sawing both mill production and operating costs are practically the same as before. A trained forester employed by the company marks all the trees to be cut. W. A. Holt said that the selective logging of his company, the Holt Lumber Co., Oconto, Wis., has not resulted in the blowing down of the thinned timber. "Selective logging costs no more," he said, "for it costs less to log big logs than small ones. It is a good thing; I only wish we had started it 25 years ago, then we would have had something worth while by now."

CORRECTIONS

Charles F. Irish, arborist of Cleveland, Ohio, points out an error in the item "Transplants treated with compressed air" which appeared on page 17 of the FOREST WORKER of May, 1928. Mr. Irish states that the method of treating transplanted trees with compressed air forced in among their roots was originated by his firm, the Chas. F. Irish Co. (Inc.), instead of being suggested to it by botanists of the Ohio Agricultural Experiment Station, as was stated in that item. He adds that this method of supplying oxygen to tree roots was developed primarily for the correction of injurious conditions caused by filling in earth over areas occupied by the roots of trees. The editor regrets the misunderstanding through which he failed to give proper credit to the originator of this method.

C. E. P. Brooks, whose article in the Meteorological Magazine on the influence of forests on rainfall and run-off was quoted on page 17 of the July, 1928, FOREST WORKER, is a member of the meteorological staff of the British Meteorological Office, London. In identifying him with Clark University the FOREST WORKER confused him with Charles F. Brooks.

Foreign Notes

Japanese Measure Effect of Forest on Run-off

Observations of run-off from forested and deforested land were made by foresters of the Japanese Ministry of Agriculture and Forestry on a watershed at Hatuhata, Ibaraki Prefecture, from 1906 to 1919. The area, of 15.68 hectares (about 39 acres), is situated on a small tributary of the River Naka. It slopes to the southwest and has elevations of from 1,073 to 1,247 feet. In 1906 about 30 per cent of the area was covered with an old stand of conifers and the remainder with a young stand of broad-leaved trees. In 1916 all the trees were cut down. Within the nine years of the observations the annual precipitation ranged from 53 to 70 inches.

For the three years 1911–1913, when the watershed was wooded, the ratio of run-off to precipitation averaged 57.5 per cent. For the 3-year period 1917-1919, following the cutting of the timber, the corresponding ratio was 60.3 per cent. Before deforestation the ratio of run-off to precipitation (observations being taken about every 10 days) showed practically no variation as between the warm season, April–November, and the cold season, December–March. After deforestation the ratio was twice as great in the cold months, the season of snow, as in the warm months.

A summary of the results of this study of watershed protection has now been made available in English in a publication of the Japanese Ministry of Agriculture and Forestry entitled "Outline of the Work of the Forest Meteorological Stations."

Temperature Affects Probable Success with Pine Seed

Studies by the Swedish Forest Experiment Station in selection of Scotch pine seed according to similarity of conditions in the place where the seed are grown and the place where they are to be planted have led to the following conclusion: If pine seed are used from a locality the mean temperature of which for the months of June to September or of September alone is 1° C. higher than that of the planting site, there is probability of a loss in survival of 35 per cent (June–September) or 27 per cent (September), respectively, greater than if the seed had been gathered in the locality where they were to be planted. The difference in mean temperature may be due to a difference in latitude, a difference in altitude, or both.

On this basis the experiment station is advising forest owners not to mix cones or seed of pine from different districts and different levels, and not to use pine seed if the mean temperature of their source is not known.

Bringing Up the Forest Planting Idea in France

In 1920 the French Administration of Forests and Waters began an active campaign for reforestation of denuded lands in the Department of Corrèze, in southern France. Wars, invasions, and civil conflicts reaching back to Cæsar's campaign against Vercingetorix, grazing, tree diseases, and destructive cutting, had all contributed to the formation of a denuded area of 140,000 hectares. The French foresters in their endeavor to restore the forest by interesting landowners in the project used tracts, conferences, and the delivery of planting stock. To smooth the way for those whose interest was aroused they cut down Government red tape to a minimum and provided special assistance in drawing up applications for Government subventions. The first year 168 applications were received, and by the eighth year the applications had grown in number to 726. In 1920, 627,000 little trees were planted; in 1927 the number planted was 2,728,700. About 1,048 hectares a year is the average area reforested during the eight years. In the early years a good deal of seed sowing was done also, but the amount of seed sown was reduced four-fifths by the last year. The effect of active propaganda for reforestation is shown in the figures for the years before 1920 and those after. From 1869 to 1919 only 7,449 hectares were reforested; for the eight years from 1920 to 1927 the total is 8,386 hectares.

The first nursery in the Department of Corrèze was established in 1921. The next year a new nursery was established in the neighboring Department of Lot to furnish stock for both departments. Two others followed in 1925 and a fifth in 1927. The nurseries are all in cities to which fairs or markets attract the neighboring landowners, many of whom come to the nursery for their planting stock themselves and get with it information on choice of species and methods of planting and caring for the trees.

In addition small nurseries have been established in five communes on a cooperative basis, the commune usually bearing 25 per cent of the expense. These communal nurseries have certain advantages. They grow the species wanted in the commune; the stock is acclimated and it is taken from the nursery and planted the same day, giving in some instances 100 per cent survival. They help the work of the forestry service by presenting it to local people in the light of an active agent of agricultural betterment. They arouse a special interest in reforestation in the local overseer who becomes an active worker in his community. They are also valuable as object lessons to the young people and are visited by the pupils of the schools. There are also in the department 12 school nurseries.

The reforestation work that has already been done has made a decided change in the landscape in certain parts of the department. To a traveler along the road from Tulle to Clermont, for instance, there are vistas where the wooded areas so inclose and hide the fields that they give the landscape the general appearance of unbroken forest. In another region, on the route from Tulle to Aurillac, there is a great expanse of territory where the recently established plantations give the appearance of a dense forest stand. A forest officer 68 years old who has spent his whole life in this region says: "When I was a boy there were nothing but prairies and a few birch trees all the way to the horizon. I do not recognize the place any more."

Movable Nurseries

The advantages of what he calls "movable nurseries" are enumerated by N. I. Crahay in the May number of the Bulletin of the Central Forestry Society of Belgium. On chosen parcels of land on the site to be reforested, strips about 1 meter wide are cleared and worked and planted with seed. Three, four, or five years afterwards the plants are taken up with a ball of earth around the roots of each and set out. Instead of seed, 1-year seedlings from a regular nursery may be used in the strips and transplanted 2, 3, or 4 years later. The scheme of raising the planting stock on the planting site avoids all the risks incident to packing and shipping and the many handlings involved. Transportation costs are reduced to the minimum. The plants can be taken from nursery to planting site in wheelbarrows. Wider spacing is possible because the planting stock is larger. The chances of survival are greatly increased. If care is taken to figure out in advance where planting will be needed time can be gained by starting the stock four or five years early.

M. Crahay states that the pineries of the forest of Soignes were all established by this method and with great success. The method is recommended for unfavorable conditons such as abundant herbaceous vegetation competing with the trees, or where the trees are apt to be attacked by rabbits, because the greater age and size of the trees that can be used give them a better chance. The nursery strips themselves can be closed against rabbits or other game animals.

This method may be used for other species but is recommended especially for the pines.

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The report of the Burma Forest Department for 1926–27 indicates that during that year the department had working plans under preparation for areas totaling 6,926 square miles. Areas under sanctioned plans had been increased from 10,855 square miles in 1920–21 to 15,573 square miles in 1926–27. Areas for which plans were required and not yet under preparation amounted to 4,301 square miles.

The areas that had been successfully reforested by planting, by the beginning of that year, were reported as more than 123,000 acres.

American Trees in Manchuria

American trees are being grown in Manchuria, according to a communication from one of the agricultural experiment stations of the Southern Manchuria Railroad. The black walnut is very hardy but grows slowly. The boxelder is hardy, grows rapidly on deep, loamy soil, and in the gardens and parks is one of the most common trees. The black locust is extremely hardy and is spreading rapidly by means of root suckers. The white ash grows better than any of the Manchurian native ash species and appears to be desirable for propagation in Manchuria. The butternut, hickory, and sugar maple have not proved hardy. The jack pine makes a good growth, but so far has been planted only as an occasional tree. The pitch pine is hardy, but until it is four or five years old needs protection against frost. Under what severe conditions these trees are growing in Manchuria may be realized from the fact that the minimum temperature during the winter is around 60° below zero, and that during the summer a maximum temperature of 90° is experienced. Most of the precipitation comes in the form of rain during the summer; during the winter period only a very small amount of snow covers the ground. Tree survival under such conditions is decidedly unusual.

Forests of Russia

In a recent report by the chief of the Russian forest administration, summarized by A. Arnould in the June number of Revue des Eaux et Forêts, the forest lands of Russia are estimated as follows:

Region	Total forest land	Government forest land		Total accessible forest land	Per cent of land area forested
		Total	Under administration		
	Thousand hectares	*Thousand hectares*	*Thousand hectares*	*Thousand hectares*	
Northwest	12,083	100,270	99,957	8,575	37.4
North	79,708	77,824	75,688	60,374	49.7
West	3,607	2,519	2,468	2,764	24.2
Center	11,909	8,804	8,716	10,444	31.9
Viatka	11,995	10,670	10,314	10,700	45.5
Oural	80,700	77,249	71,076	37,980	22.9
Middle Volga	3,147	2,597	2,546	2,844	11.8
Lower Volga	1,440	934	921	1,150	4.2
Center Tchernozem	1,471	940	922	1,364	7.3
Caucase	3,127	1,961	1,954	2,709	10
Siberia	255,965	252,643	252,359	133,019	30.5
Kirghiz	1,992	1,992	1,992	1,042	4.2
Far East	102,561	100,646	100,513	80,656	31.6
Total	569,705	639,049	629,426	353,621	29.7

The annual growth of the accessible forests is about 314,030,000 cubic meters and the output about 203,028,800 cubic meters. The reasons for the failure to cut as much as the annual growth in the country as a whole are the difficulties of logging in the important forest stands, the object of management which is often merely to supply local demands, especially in north Siberia and the Orient, the exhaustion of the forests in parts of the country that have great need for fuel wood, the lack of roads, and the scattered population. The cut in the Far East, Siberia, the Caucasus, and the region of the North and the Oural is only about 16.3 per cent, 41.7 per cent, 75 per cent, and 78 per cent, respectively, of the amount that could be taken out annually.

Logging operations on lands managed directly by the Government are carried on on an area of 95,000,000 hectares—65,000,000 hectares in Europe, 20,000,000 in Siberia, and 10,000,000 in the Far East. The volume of timber from these forests transported far from the place of production is 45,322,000 cubic meters of lumber and 43,819,400 cubic meters of fuel wood.

The accesible lands actually forested amount to 297,689,400 hectares. Areas covered by different species are estimated as follows, the basis being theoretical pure stands:

	Government forests (thousand hectares)	Community forests (thousand hectares)
Scotch pine	47,374	2,619
Spruce	64,860	2,013
Other conifers	44,047	111
Oak	1,690	20
Other hardwoods	39,418	1,983
Species not classified	93,549	----------
	290,938	6,746

How Temperature Affects Oak and Beech Distribution

The distribution limits of beech and oak have been correlated with temperature by Doctor Wladimir Köppen in his studies of these two genera in Europe. In Madeira, where the temperature the middle of every month is above 59° F., the beech retains its leaves only 7 months and the oak somewhat over 10 months. Wherever the duration of temperatures above 40° F. is less than 7 months in the case of beech and 10 months in the case of oak, both trees put out leaves as soon as the temperature reaches 40° in spring and change their color when it reaches 40° in the autumn. The oak requires 3½ months with temperatures over 40° to carry on assimilation, whereas beech requires 4 months in the plains and 3 months in the mountains with temperatures above 40°. For those internal processes which continue within the plant after leaf fall the oak requires 5 months with temperatures above 35°, and beech in the plains requires 8—in the mountains 7—months above 33°. These internal processes appear to cease at about this temperature. The oak can endure nearly 7, but the beech only 3 months below this temperature; however, neither tree requires such low temperatures.

Forest Vegetation in Turkestan

Excerpts from article by V. PELTS in the Indian Forester

In Turkestan forestlike desert vegetation is met usually only far away from towns, big roads, and railways. All easily accessible places are usually devoid of big dendroid vegetation and are covered with moving sand dunes. About the terrors of these, travelers have circulated much exaggerated tales. Usually the belt of moving sand dunes is only 30 to 50 kilometers (20 to 30 miles) wide and is due mainly to extermination of vegetation by concentrated action of animals belonging to villagers inhabiting adjoining cultivated lands. In the desert there is a much larger nomadic population than the traveler suspects, but such nomads live in tents near their wells which are situated far from big roads. They avoid the neighborhood of big roads for two reasons: The vegetation near roads is poor owing to damage by animals belonging to caravans; and, secondly, being Mohammedans they adhere to the old law of the desert in offering hospitality to travelers. They are fond of society, but on the roadside the number of guests entertained would be beyond their means. No man can live in the desert without large flocks of sheep and many camels to transport his camp, but he migrates systematically in the area near his well and the vegetation does not suffer as it does from the concentrated action of animals belonging to settled villagers and caravans. The guides taken by travelers from villages never find any nomads in the desert because they themselves are afraid to leave the main roads. The dendroid vegetation consists of *Art. arborescens* and *Art. haloxylon*, *Salsola richteri*, *Ammodendron conollyi*,[1] and *Am. karelini*.

Excellent results have been obtained in afforestation of sand dunes along the Central-Asian Railway. A stretch of about 200 miles, where trains were formerly obstructed by moving sand dunes, has been fixed by cultivating saksaul and other plants such as *Am. conollyi*, *Salsola richteri*, *Calligonum caputmedusæ*, and desert grasses. By restricting the grazing of animals, up to 100 tons of firewood can be produced per hectare (2.47 acres) each 20 years, on suitable soil. The established conception that saksaul was growing very slowly was founded on the well-known fact that you can count on a cut tree the yearly (annual) rings (layers) of growth. However, the procedure proved to be wrong in the case of saksaul, for evidence discovered through cultivation showed that a tree 10 inches in diameter with 80 or more "rings" might be only 15 to 20 years old. This tree baffled the botanists, therefore, until the forest service found it out by cultivation. The "rings" correspond merely to periods of increased growth, due either to rains (5 inches per annum) or to periods of increased differences of maximum and minimum temperatures in 24 hours, when desert sand condenses more moisture from the air at night and salines do the same. A similar phenomenon is likely to be met also, with some other desert plants.

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[1] *Ammodendron conollyi* and *karelini* belong to the family *Leguminosæ* (***Papilionaceæ***).

Where Forests Mean Tombs

R. K. Beattie, pathologist of the Bureau of Plant Industry, has written from Keijo, Korea, that "the Koreans strip every bit of ground of every tree and shrub and burn everything down to the needles. Then in winter they dig up the roots and burn them. The soil here is a coarse decomposed granite and washes badly, so when the forest cover is gone the erosion is tremendous. The rains, when they come, come in torrents.

"When you want to find a virgin forest here you look for a Korean king's tomb; and, conversely, when you want to find a tomb, you look for a forest. For when one stands at a Korean king's tomb everything in sight must be green.

"At Koryo there is a tomb and also a forest. In the forest are chestnut trees 1½ to 4½ feet in diameter. They branch rather low and would not make very good logs, but they would cut up into a lot of extract wood. They are *Castanea crenata*. The experts differ as to whether they are native. It is the same species as in Japan. There are lots of *C. crenata* trees planted around here and we'll probably be able to get nuts this fall. I'm getting fine cooperation from the Japanese scientists."

Schlich Memorial Gets Subscriptions

Subscriptions toward a memorial to Sir William Schlich by June of this year amounted to £1,725, of which £278 was subscribed in the United States. At the request of the committee in charge of the memorial the British forestry authorities have agreed to set aside a forest area to be named the Schlich Forest, situated if possible within easy reach of Oxford. This area is to be available for experimental work, and on it a group of oak trees are to be planted and maintained. A bronze portrait plaque of Sir William has been ordered at a cost of about £24, which is to be erected in the School of Forestry, Oxford. The remainder of the sum subscribed, after payment of incidental expenses, is to be placed in trust and invested, and the proceeds are to be devoted to the payment of an annual personal grant for the furtherance of study or research in forestry. This grant is to be awarded by the trustees to different parts of the British Empire and to the United States in rotation. The selection of the country in which the award is to be made in any year is made discretionary with the trustees.

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One-third of all the forest-fire outbreaks recorded by the provincial government of Ontario last year were first reported by the public.

Elementary Forestry Schools in Finland

Finland has five elementary forestry schools, to which students may be admitted on completion of the general elementary school course. Instruction is given in Finnish at four of these schools and in Swedish at the fifth. The course covers two years. Advanced education in forestry is offered by the university, which gives a course of theoretic and practical instruction that lasts three or four years and is followed by one year of practice. The university also offers graduate courses leading to higher degrees. A technical school of sawmilling at Viborg, privately maintained but in receipt of Government grants, trains foremen for the sawmills and other woodworking mills.

The forest research institute, established in 1917, employs three professors, with assistants, who engage in research in silviculture, forest mensuration and management, and forest soils. A second forest research organization is the society of forestry, founded in 1909.

Airplanes for Fire Fighting and Surveying in Canada

A fleet of 22 airplanes is maintained by the Province of Ontario to detect forest fires and carry men and equipment to fires in isolated forest regions. When not needed for these purposes the planes are used in survey work. The Province has now surveyed and mapped 52,496,000 acres of land. The surveys show that 49 per cent of this area supports stands of mature timber, 34 per cent is occupied by young growth, and only 6 per cent is waste land.

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Tank cars are maintained by the Canadian Pacific Railway at six different points for forest protection. Each car holds 7,000 gallons of water and is equipped with steam pumps, a mile of hose, and Siamese connections and nozzles.

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Three new forest reserves have recently been created in British Columbia, two including 65 square miles on Redona Island and one of 925 square miles on the Morice River. There are now 18 forest reserves in the Province, with a total area of 6,400,000 acres.

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The New Zealand Government has removed all restrictions on the export of timber produced in the Dominion. A notable feature of the restrictions thus lifted was the limitation on shipment of kauri pine, which in recent years has been drawn closer each year.

Carbide Lamps for Night Fire Fightir

Experiments of the Canadian Forest Service wi "headlights" for use by fire fighters have resulted favor of carbide lamps such as are used by miners. T electric safety lamps tried were objected to because their weight of 5½ pounds, the recharging faciliti needed, and the cost. The carbide lamp, writ James Smart in the Forestry Chronicle of the Canadia Society of Forest Engineers, gives very nearly as muc light as the electric lamp and weighs only 6 ounce It needs a recharge of carbide about every 1½ hour A convenient canister fitting the hip pocket hol several hours' supply of carbide. The outfit of lam cap, and canister costs less than $2. The dang involved in using a naked flame does not seem to th Canadians to be serious, and it is pointed out that t inclose the flame under glass results in concentratin the light rays to a beam, thus lessening the efficienc of the lamp for fire-fighting use.

The manufacturer of the lamp adopted is now pr ducing for the use of the Canadian Forest Service lamp with an improved nickeled reflector, flame win protector, and a cap that is adjustable to the size of th head. The 5 and 10 men units in which the lam equipment is assembled by the service include, wit the lamps, caps, and pocket canisters, two large ai tight canisters holding several days' supply of carbid nested in a container handy for transportation an back packing.

A crew equipped with these lamps, Mr. Smart point out, not only is enabled to carry on suppressio activities at night, under better working condition than those of the daytime, but can be led to a fire a night.

Local Fire Protection in France

The fire protection association of the Canton o Mezin, Department of Lot-et-Garonne in southwester France, with a membership of 182 proprietors an turpentine operators, reports that in five years seve fires have occurred and hardly 20 hectares have burne in its territory. Intensive fire prevention propagand is carried on and in addition there is a competent an well-organized suppression system. In every house i the wooded communes a printed card bearing fire control instructions is posted. Thirty-one crews, eac with a chief deputized by the mayor, have been organized. Tools and equipment have been furnished eac crew and also placed in convenient depots. Twelv observatories with telephones and alarm horns ar manned during the fire season. The association provisions the workmen who take part in fire suppressio and indemnifies them for the time taken from thei regular employment. This association is one of 2 or more in the Departments of Gironde, Landes, Lot-et-Garonne, and Dordogne, near Bordeaux in southwestern France.

Personals

Joseph H. Faull, of the Department of Botany, niversity of Toronto, has been appointed professor forest pathology at Harvard University.

D. B. De Merritt has resigned as extension forester Louisiana to accept a position in the Forestry epartment of the Pennsylvania State College, where will teach forest management and mensuration. efore he entered extension work in Louisiana in 1926 r. De Merritt was an instructor in the University of aine.

Arthur I. Weinstein, physiological plant anatomist the Forest Products Laboratory, has resigned to cept a position with the Sturgeon Bay Fruit Co.

A. J. Stamm, colloid chemist of the Forest Products aboratory, has gone on leave to avail himself of an ternational Education Board fellowship. He will gage in research at the University of Upsala, Sweden, der the direction of Prof. The Svedburg.

C. L. Marlatt, Chief of the Bureau of Entomology, s been designated as Chief of the Plant Quarantine d Control Administration of the Department of Agrilture, established July 1, 1928. S. A. Rohwer has been signated assistant chief of this administration.

J. E. Graf has been made Assistant Chief of the ureau of Entomology. He will continue his assignent as leader of the truck crop division of the bureau.

Forman T. McLean has resigned as head of the plant hysiology department of the Agricultural Experiment ation at the Rhode Island State College.

Jesse C. Nellis has been appointed chief of the mber division of the Bureau of Foreign and Domestic ommerce, the position in which he has been acting nce Axel H. Oxholm became director of the National ommittee on Wood Utilization. Mr. Nellis joined e division in 1922 as assistant chief.

John D. Coffman, supervisor of the California ational Forest, has been detailed to assist officers of e National Park Service in developing fire-control ans for the national parks. His detail will probably tend over a year.

Ferdinand W. Haasis has resigned as assistant silculturist of the Appalachian Forest Experiment ation to accept a position at the University of Idaho. here he will be associate professor in the school of restry and associate forester of the university's rest experiment station.

Carlos Avery has succeeded John B. Burnham as esident of the American Game Protective Associaon. Mr. Avery, who was formerly game commisoner of Minnesota, has been secretary and treasurer the association for the past five years.

E. E. Horn, associate biologist of the Bureau of Biological Survey, formerly stationed at Phoenix, Ariz., as a field investigator in eradication methods, has been assigned to duty at the California Forest Experiment Station.

Gerhard Kempff, assistant silviculturist of the Northern Rocky Mountain Forest Experiment Station, has been appointed associate professor at the School of Forestry of the University of Idaho. Mr. Kempff has for a number of years had charge of the Priest River Experimental Forest.

Ralph M. Lindgren, of the office of forest pathology, Bureau of Plant Industry, has been assigned to duty at the Southern Forest Experiment Station.

H. A. Smith, district forester in charge of the Pottsville district, Pennsylvania, has been chosen as assistant State forester of Florida.

Gilbert Y. Bell has been appointed assistant State forester of Kentucky. Mr. Bell is a graduate of the Pennsylvania State College and has served for the past year as a ranger on the Shenandoah National Forest.

T. A. MacElhanney has been appointed director of the Forest Products Laboratories of the Dominion of Canada, at Ottawa, succeeding William Kynoch, now associate professor of forestry in the School of Forestry and Conservation, University of Michigan. His successor as director of the forest products laboratory at Vancouver is R. M. Brown, formerly district inspector of forest reserves for the Railway Belt, stationed at Kamloops, British Columbia.

C. J. Maneja, assistant chief of the branch of lands, Philippine Bureau of Forestry, after his graduation from the Yale Forest School in June of this year visited a number of the national forest districts of the United States and spent two months in Washington, D. C., studying the work of the Forest Service. Vincente C. Ramos, chief clerk of the Philippine Bureau of Forestry, has likewise been making an extended visit in this country studying the Forest Service organization and administrative methods.

C. H. McLees, of the faculty of the North Dakota School of Forestry, has been elected to the executive committee of the North Dakota Academy of Science.

Newly elected officers of the biological sciences section, Southwestern Division, American Association for the Advancement of Science, are chairman, F. J. Crider, Boyce Thompson Southwestern Arboretum, Superior, Ariz.; vice chairman, Quincy Randles, United States Forest Service, Albuquerque, N. Mex.; and secretary, W. G. McGinnies, University of Arizona.

Officers recently elected by the Appalachian section of the Society of American Foresters are C. F. Korstian, Appalachian Forest Experiment Station, chairman; M. A. Mattoon, Pisgah National Forest, vice chairman; F. W. Haasis, Appalachian Forest Experiment Station, secretary.

Donald R. Brewster has been assigned as manager of the field office newly established by the National Lumber Manufacturers' Association at Memphis, Tenn. Mr. Brewster was educated as a forester and had 10 years' experience in the United States Forest Service, including three years in research and extension work as a member of the staff of the Forest Products Laboratory. Since 1920 he has been engaged as a dry kiln specialist in woodworking plants.

David H. Madsen has resigned as State fish and game commissioner of Utah to accept the superintendency of the new migratory bird refuge to be established at Bear River Bay, Utah, under the provisions of a law passed at the recent session of Congress.

John P. Wentling, formerly of the division of forestry in the University of Minnesota, has been appointed director of the research division of the Western Red Cedar Association, with headquarters at Minneapolis.

Ralph C. Bryant, professor of lumbering in the Yale Forest School, received the honorary degree of doctor of science from Middlebury College at its commencement of June, 1928.

Frank S. Moore, formerly assistant supervisor of Payette National Forest, Idaho, has been made su visor of the Caribou National Forest, Idaho.

Arthur L. Nelson, technical assistant on the Color National Forest, has been made supervisor of the Le ville National Forest, Colo. Lewis R. Rist, form supervisor of the Leadville Forest, has been transfer to the White River National Forest, Colo., as su visor.

E. M. Eutsler has accepted appointment as dist forester in charge of district 4, North Carolina. Eutsler has been employed by the Montgomery Lu ber Co. for the past eight years.

Paul D. Kemp, senior forest ranger on the Washa National Forest, Wyo., has gone on leave of absenc take advantage of a fellowship in wood technology the University of Idaho.

Henry Charles Hulett, senior forest ranger in Portland, Oreg., office of the United States For Service, has gone on leave of absence to attend University of Michigan, where he will work for master's degree in forestry.

Glen Meginnis, one of this year's forestry gradua of the Iowa State College, has taken the teach fellowship in the forestry department of the college the coming school year. A. A. McCutcheon, a 1 graduate of the Colorado Agricultural College, accepted the research fellowship in the Iowa school.

Bibliography

A Manual of Woodland Management

By C. R. Tillotson, United States Forest Service

Anyone interested in the management of timberlands in Illinois or adjacent States will find real help in C. J. Telford's bulletin, A Manual of Woodlot Management, published by the Division of the Natural History Survey, Illinois Department of Registration and Education. To the student of forestry this publication is a treat because it gets away from generalizations and down to specific cases. Written by a trained man who has spent a number of years in field work in the woods of the State, it gives the impression that the author knows what he is talking about. Illinois is fortunate in having a woodsman who can successfully put in writing so much that he has learned through study and experience in her woodlands.

The big appeal of this bulletin is the understandable manner in which it outlines and discusses the problems involved in the management of Illinois timberland. It covers the usual run of subjects—cutting syste growth and yield, planting, protection, and measur and marketing. In every case the discussion de specifically with the existing timber or with pres forest conditions in Illinois.

At the outset there is given a summary of gene measures in the management of natural woods, wh ends with the remark that "in forest managem judgment rather than rules must be followed." Telford might have added that good judgment forestry is acquired only through years of experie in the woods. A short discussion of the woodland a source of supply for the farm gives a picture of fa needs and of the area of woodland required to sup those needs. In the discussion of protection it brought out that the injury from pasturing the wo is greater than the injury from all other sources co bined. A chapter on the adaptation of trees to s gives the average rates of growth of various trees six easily recognized general soil types. It definit recommends species to be grown on these individ oil types. Two kinds of silvicultural management are iscussed, the "even-aged" system and the "selection" ystem. These two systems are discussed primarily ecause even-aged woodlands are common through arts of Illinois and uneven-aged stands are common hroughout the State. Such points are brought out as he number of trees that will start on an acre and the umber that will normally be there after 40 years, fter 80 years, etc. A plea is made for growing timber o the larger sizes, particularly for tie production. Ir. Telford shows that if a tree is cut at the age of 52 ears, when it will produce but one tie, the gross annual turn is approximately 1 cent, whereas if the tree is ft standing until it is 103 years old and will pro- uce five ties, the gross annual return is about 5½ cents.

Planting is discussed under the headings of planting o reenforce hardwood stands and planting cleared reas. The author takes the position that in plantings o reenforce hardwood stands hardwood trees should e used rather than conifers. There is a brief dis- ussion of Christmas tree plantations and a longer ne of plantations for post production.

In his chapter on measuring and marketing woodland roducts Mr. Telford provides tables which will give he owner an idea of just how far he can profitably hip his products, whether they be mine timbers, ross-ties, veneer logs, or something else. He appends list of consumers and dealers in the State, by counties, hich should be a big help to the prospective seller.

A Book on Malay Trees

By E. N. MUNNS, United States Forest Service

F. W. Foxworthy's Commercial Timber Trees of he Malay Peninsula should prove of great value to orest officers and others concerned with the timber rees and forest resources of the Malay Peninsula and he related East Indies, and be widely welcomed as an mportant addition to tropical forest literature. The uthor has provided a handbook that will aid in identi- ying the more important trees of Malaya and that urnishes information regarding each of these species. ince the tree species of Malaya are very numerous, was found necessary to restrict the work to those hat can be regarded as commercial timber trees or hat are so conspicuous in appearance as to compel ttention in the forest. The book lays the foundation or further detailed study of trees that are likely to ecome an important source of revenue.

Three main classes of forest are recognized—the ttoral forests of the beaches and mangrove swamps, hich produce relatively few timber trees; the hill orests, occurring at elevations above 2,000 feet, hich at present are not economically important; and he lowland forests, comprising the fresh-water swamp orests and the inland "rain" forests. The forests of he fresh-water swamps contain a comparatively small umber of species; the rain forests, made up of a very large number of species, include most of the commercial timber trees of the country. It is with rain forests, therefore, that the author is chiefly concerned.

The area occupied by commercial forests in Malaya is estimated at about 30,000 square miles, in addition to the considerable areas on which the original forest has been destroyed and is now being replaced in part by second growth.

Although a wealth of tree species is contained in the complex forests of Malaya, only a small proportion of these are economically important. About 2,500 species are known to occur in the peninsula, and it is estimated that the number actually occurring is one-third greater than this; but Foxworthy describes only 65, and of these probably less than 20 are of outstanding importance.

After a general description of the forests of the Malay Peninsula, the book gives a key to the identification of the species described. The key is a very practical one, based largely upon those characters that are likely to be the only ones observable unless trees are felled. These are the character and structure of the outer bark and of the inner bark and sapwood, the occurrence of buttresses, and characteristics observable in fallen leaves. Alternative names of the trees are given, information as to their abundance and manner of distribution, and descriptions of their botanical characters. The commercial products of the species, and their silviculture, are briefly discussed. In the case of each of the more important species, useful information is given regarding other forms likely to be confused with it.

The methods used in collecting the information here presented are such that the book commands confidence. Extensive collections of herbarium material were made as a basis for establishing the botanical identity of trees and particularizing as to the trees' distribution. Information as to the relative and actual abundance of the different forms was obtained through special valuation surveys covering more than 1,000,000 acres in different tracts, and this work was supplemented with a careful field study of the species themselves. Information available in the records of the Malayan forest department regarding silvicultural treatment was incorporated into this book only after careful revision and comparison with records of experience in other countries.

The volume is very fully illustrated with photographs of the trunk and bark of species described, and, wherever feasible, of their foliage, flowers, and fruits. Both in manner of presentation and in quality of printing and illustrations, the book sets a standard rarely reached in government publications.

(F. W. Foxworthy: Commercial Timber Trees of the Malay Peninsula. Malayan Forest Records No. 3. Pp. 194, 10½ by 7¼ inches. Conservator of Forests, F. M. S. and S. S., Kuala Lumpur, Federated Malay States, 1927.)

Pruning White Pine for Profit

By W. R. MATTOON, United States Forest Service

In a bulletin entitled "Pruning White Pine for Profit" the Harvard Forest and the Massachusetts Forestry Association have published a summary by A. C. Cline and E. D. Fletcher of conclusions arrived at by themselves and by a number of woodland owners and other foresters through observation and experiment. A foreword by R. T. Fisher, director of the Harvard Forest, and Harris A. Reynolds, secretary of the Massachusetts Forestry Association, states that "in pure [northern white] pine stands clear lumber can be secured only by the removal of side branches when the trees are small. This report is a preliminary study of pruning as a means of increasing profit." The authors' first word, however, is a warning to owners of northern white pine woodlands not to let alarm over the prospect of a low-grade yield tempt them into unjustifiable pruning. Pruning is unprofitable, they say, if applied to stands composed of badly weeviled trees having large limbs, to boles 6 inches or more in diameter, or to every tree in a stand. The results of such practices will be on the wrong side of the ledger because of the heavy initial cost of the work and because of the low grade of the product—which may be even lower than if the trees had not been pruned.

Pruning northern white pine is a very profitable undertaking, these authors tell us, if it is limited (1) to stands composed of straight trees with small limbs (averaging under 1 inch in diameter); (2) to selected trees of the dominant class which are to compose the final crop; and (3) to trunks of relatively small diameter, preferably not more than 4 inches at breast height. Timely and skillful pruning of northern white pine stands within these limitations may increase profits by from $15 to $35 or more per 1,000 board feet, in addition to yielding 6 per cent compound interest as an investment.

Results are given of time studies by the Harvard Forest in pruning a badly weeviled plantation and a densely stocked stand of natural origin. Rates were found to range from 50 to 200 linear feet of bole per man-hour; varying with factors such as degree of weeviling and limb size. On the basis of 50 cents an hour as the cost of labor and 14 feet as the length of the pruned butt logs, costs of pruning per 1,000 board feet are estimated at the end of the rotation (at 6 per cent for an average of 35 years) to amount to $11.04 if pruning is done with the minimum speed and to $2.76 if it is done at the maximum rate. A table shows estimated net values per 1,000 board feet of lumber sawed from 12-inch pruned logs 14 feet long having central knotty cores ranging from 2 to 7 inches in diameter. At assumed prices of $25 for knotty and $50 for clear lumber, the total returns per 1,000 board feet from pruned trees are $49.23 for logs with 2-inch cores and $39.83 for logs with 7-inch cores, as compared with for logs of the same size from unpruned trees.

The factors of growth, form, and soil quality t influence the practice of pruning northern white p trees are discussed, also the effect of pruning on gro and on quality of lumber. Recommendations made as to the stage of development at which prun may well be begun, the choice of season, the num and kind of trees to prune, methods and tools to u the desirable degree of severity, the time for mak subsequent prunings, and thinning of the pruned sta

This 24-page bulletin, well illustrated with pho graphs and charts, is available on payment of 50 ce to either of the joint publishers.

Why Grow Timber?

A 14-page circular by W. N. Sparhawk, of the Unit States Forest Service, just issued by the Departme of Agriculture under the title "Why Grow Timbe gives in condensed but readable form the facts abo the amount of timber needed in the United States a the possibilities of obtaining supplies from forei countries and of growing adequate supplies at hon The chief conclusions reached by the author are th our need for timber is not likely to decrease in t future; that as the virgin forests are more and mo depleted the very factors that might cause us to u less will tend to insure prices sufficient to make timb growing profitable; that nature unaided will not gro timber for us in sufficient quantity; and that the de ciency in our supplies can not be made up from forei sources. To insure supplies sufficient for our needs must undertake to grow our own timber.

Copies of this circular may be obtained from t Forest Service, Washington, D. C.

Facts About Outdoor Recreation Are and Their Uses

A brief survey covering the greater part of the fie of outdoor recreation in the United States is given Senate Document 158, recently issued by the Gover ment Printing Office. This publication, entitl "National Conference on Outdoor Recreation," is handy reference book for anyone interested in th recreational use of forests or parks. It epitomizes th results of major fact-finding surveys and projec undertaken under the auspices of the National Co ference on Outdoor Recreation. It not only giv facts and figures in regard to recreational areas, an their development and use, on National, State, muni ipal, and county parks and Federal lands like nation forests, the public domain, and Indian reservation but discusses the policies under which these areas a administered and the facilities available in this countr for the training of leaders in recreation. It contain also chapters on the conservation of the elk of Jackso Hole, Wyo., and the contribution that museums ca make to outdoor recreation.

A Note on Volume Table Construction

By Lester H. Reineke, United States Forest Service

Reports on the use of Forest Service Tree Measurements Form 558a suggest the need of a little further explanation as to how it should be used. This form, which was described in the November, 1927, number of the Forest Worker, consists in a specially designed graph paper on which the tree measurements are plotted as they are taken in the field. A curve drawn through these points shows the form of the entire tree stem, and volume in cubic feet can be accurately determined by measuring the area under the curve with a planimeter. Volume in board feet can be quickly read from a transparent scale placed over the graph.

In using this form it should be kept in mind that the taper curve fitted to the plotted points should be a curved line rather than a series of straight lines connecting the points. If straight lines are used two types of error will be introduced. The first is an error in volume and is proportionate to the area of the graph between the straight lines and the curved line through those same points. The volume of the straight-line taper graph may be greater or less than the true volume shown by the curve taper graph. (The straight-line taper graph shows the volume by the Smalian, or paraboloid, formula, since on this paper straight lines represent paraboloids.) The second type of error enters in determining the merchantable length, or height to a given diameter. The straight-line form of taper curve may increase or decrease this measurement, according to the taper curve's degree and direction of curvature.

The magnitude of the errors will depend on the form of the tree, its size, and the relative length of the sections. As the sections decrease in length the errors become smaller. In one group of trees individual errors were as large as 12 or 13 per cent. In the group of second-growth trees tested the average error was 4 per cent.

Form 558a is available to the public by purchase from the Superintendent of Documents, Government Printing Office, Washington, D. C., at the rate of $1 per 100 copies and $7 per 1,000 copies.

Directions for Forest Planting on the Great Plains

Tree Planting in the Great Plains Region, Farmers' Bulletin No. 1312, presents detailed directions for establishing windbreaks and woodlots. The authors are Fred R. Johnson, Forest Service, and F. E. Cobb, Bureau of Plant Industry. The subjects they discuss include the selection of planting stock, ways of obtaining it, preparation of the soil, time and methods of planting, and care of the plantations. Copies of the bulletin can be obtained free of charge, while the supply lasts, by writing to the Department of Agriculture, Washington, D. C.

A Pamphlet of Experience and Opinion on Growing Southern Pine

A recent publication of the United States Forest Service entitled "Growing Pine Timber for Profit in the South" contains statements of actual experience with the growing of pine by landowners and of opinion by recognized authorities in regard to the possibilities in timber growing in the southern pine region. By reading this pamphlet the owner of pine land in the South can learn what his neighbor is doing about timber growing and what practical men think of the outlook for profit in pine. The pamphlet is Department of Agriculture Miscellaneous Publication No. 24. It may be obtained as long as the supply lasts from the Forest Service, Washington, D. C.

Black Locust for Idaho

By Perkins Coville, United States Forest Service

In a bulletin entitled "Black Locust and How to Grow It," published by the University of Idaho School of Forestry, Dean F. G. Miller recommends the black locust as a profitable crop for land in southern Idaho that is under 4,000 feet in elevation. Where annual rainfall is less than 15 inches the trees require irrigation. Dean Miller's recommendations are based on a study of 17 farm woodlands in southern Idaho. On the basis of 5 per cent compound interest and without subtracting taxes and water rents, he estimates the average returns from these woodlands for the 13-year rotation as $31.88 per acre per year. He gives estimates of the present value of the individual woodlands for fence posts, gross and net, and of the annual returns upon initial investment in such woodlands. Information is given, also, as to correct methods of raising black locust trees from seed and planting them in the field, caring for the plantation, and harvesting the crop.

No mention is made in this bulletin of the danger of invasion of Idaho by the locust borer as affecting the prospects of black locust plantations in the State.

Central States Bibliography

A bibliography on forestry, botany, and related subjects for the Central States region, comprising 35 mimeographed pages of titles, has been prepared by the Central States Forest Experiment Station and is available for distribution. Requests should be addressed to the Library, United States Forest Service, Washington, D. C.

Bibliography on Communal Forests

A bibliography on communal forests recently completed by Helen E. Stockbridge, librarian of the United States Forest Service, is available for distribution from the Washington office of the service.

Recent Books and Pamphlets

Behre, C. Edward: Preliminary yield tables for second-growth western yellow pine in the Inland Empire. 19 pp. diagrs. (University of Idaho Forest Experiment Station, bulletin no. 1.) Moscow, Idaho, 1928.

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Lodewick, J. Elton: Seasonal activity of the cambium in some northeastern trees. 87 pp. illus. (N. Y. State College of Forestry technical publication no. 23.) Syracuse, 1928.

Macdonald, J., and Guillebaud, W. H.: Growth and yield of conifers in Great Britain. 187 pp. pl., maps, diagrs. (Great Britain Forestry Commission bulletin no. 10.) London, 1928.

Masui, Kôki: A study of the ectotrophic mycorrhizas of woody plants. 131 pp. illus., pl. Kyoto Imperial University, Kyoto, Japan, 1927.

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West Virginia Department of Agriculture: West Virginia forests and forest products. 48 pp. illus., maps. (Bulletin 74.) Charleston, W. Va., 1928.

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Botanical Gazette, June, 1928.—Mutation in Pinus sylvestris, by Frank C. Gates, pp. 451–456.

Canada Lumberman, June 15, 1928.—Development of the circular saw, by S. Horace Disston, pp. 32–33.

Commerce Monthly, August, 1928.—The progress of rayon, by Janice Reed, pp. 3–11.

Cross Tie Bulletin, July, 1928.—Importance of wood utilization to railroads, by C. C. Cook, pp. 4–10.

Ecology, April, 1928.—The rôle of microorganisms in the transformation of organic matter in fores soils, by S. A. Waksman and others, pp. 126–144.

Economic Geography, April, 1928.—European forests and their utilization, by Bruno F. A. Dietrich, pp 140–158.

Forstwissenschaftliches Centralblatt, July 1, 1928.—Der heutige stand der arsenbekämpfung der forstschädlinge mittels flugzeug, by K. Escherich, pp 421–436.

Outdoor America, September, 1928.—The Kaibab, by Mark Anderson, pp. 9–12.

Packing and Shipping, July, 1928.—Gluing of wood, by T. R. Truax, pp. 7–11.

Paper Trade Journal, May 3, 1928.—The chemistry and technology of cellulose, by Ralph E. Montonna, pp. 61–67.

Pulp and Paper Magazine of Canada, June 7, 1928.—The manufacture of bleached sulphite pulp on the Pacific coast of British Columbia, by W. L. Ketchen, pp. 765–770.

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West Coast Lumberman, June 15, 1928.—How the Pacific Northwest lumber industry can be made prosperous, by William B. Greeley, pp. 15–16; Relation of growing space to specific gravity and the strength of second-growth redwood, by Benson H. Paul and R. F. Luxford, pp. 17, 32.

Recent Publications of the Forest Service

National Forest Map Folders: Kaniksu, Mono, Arapaho, Stanislaus, Monterey Division of the Santa Barbara.

National Forest Administrative Maps: ¼-inch, Allegheny, Black Hills, Coconino, Deschutes, Lolo, Medicine Bow, Ozark, Superior, Tahoe; ⅜-inch, Cherokee; ½-inch, Black Hills, Deschutes, Medicine Bow.

National Forest Proclamation Diagrams: ¼-inch, Huron, Ozark, San Juan.

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Announcements

Meeting of Society of American Foresters

The annual meeting of the Society of American Foresters will be held in New York City December 28 and 29, in conjunction with the annual meeting of the American Association for the Advancement of Science.

Cash Prizes for Economics Essays

Prizes for studies in the economic field are again offered for 1929 through the generosity of Hart Schaffner & Marx of Chicago, by a committee headed by Prof. J. Laurence Laughlin, University of Chicago. A first prize of $1,000 and a second prize of $500 are offered to residents of the United States or Canada without restriction. A first prize of $300 and a second prize of $200 are offered to those who, at the time their papers are sent in, are undergraduates of any American college. The topics which the committee suggests, but to which contestants are not restricted, include "Present and future status of the lumber industry. Preference will be given to essays that do not ru beyond 250 or 300 printed pages, and that "excel in th higher qualities of economic insight, grasp of principle power of analysis, and style." A paper will be disqualified if, before the award is made, it is printed or published in a form that discloses the identity of the autho The contest for the major prizes closes June 1, 1929, an that restricted to undergraduates on July 1, 1929 Particulars can be obtained from Professor Laughlin.

Southern Forestry Congress

The Southern Forestry Congress of 1929 will be h at New Orleans, April 4–6. The officers of the congres are president, B. F. Smith, Industrial Lumber Co. Elizabeth, La.; executive secretary, J. H. Pratt; chairman of executive committee, H. E. Hardtner; secretary, W. R. Hine; and assistant secretary, C. F. Evans

Because the free edition of this periodical is necessarily limited, it can be distributed without charge outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the FOREST WORKER can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

Material offered for publication in the FOREST WORKER should be addressed to L. C. Everard, Editor, United States Forest Service, Washington, D. C.

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State Forestry

First Forestry Fair Held at Waycross, Ga.

The State Forest Fair at Waycross, Ga., September 19–22, was pronounced a distinct success in spite of the tropical storm that visited Georgia just before its opening date. The storm closed most of the roads leading into Waycross, prevented more than one in three of the prospective exhibitors from displaying their goods, and made attendance at the fair impossible for many landowners and naval stores operators by confronting them with the problem of salvaging great quantities of wind-felled timber. Incidentally, the wind tore a 50-foot strip from the roof of the exhibit building and the excessive rainfall prevented most of the field demonstrations that had been planned. Nevertheless the attendance is reported as 3,000 or more, and some 35 manufacturers, organizations, and individuals set up an interesting series of exhibits.

Included among the exhibits were implements for use in naval stores production, forest instruments, fire-fighting and other woods implements, tractors, wood saws, models of steam and American stills, honey of forest origin, naval stores products, and a fire trailer. Other displays dealt with results of experiments in naval stores operations, right and wrong methods of land clearing, the results of pulping southern woods, furniture manufacture, rayon manufacture, the use of a portable sawmill, forest recreation and wild life, the effects of fire on tree growth, forest management methods, and forest types in Georgia.

The five lecture and motion-picture trucks assembled for the southern forestry educational project in which the American Forestry Association is cooperating with the States of Georgia, Florida, and Mississippi were brought to the fair, and their operators gave frequent picture showings by daylight as well as in the evening. The abridged program of field work included a trial of two relatively new machines for making firebreaks. This demonstration brought out the impracticality of the machines for use in the coastal plains region and provided a basis for the evolution of a machine that will be suitable for use in that region. As a substitute for the other field demonstrations planned, Alex Sessoms made several hundred people his guests on a trip to inspect the property of the Timber Products Co., at Cogdell, Ga.

At the last of the morning sessions, all of which were given over to talks by foresters, chemists, naval stores factors and operators, and others, expressions of interest and approval greeted the announcement that the Georgia Forestry Department plans for a repetition of the fair next year.

Forest Protection Goes Before the Grand Jury

The grand jury of Chatham County, Ga., in session in Savannah, listened on the evening of September 24 to a full program of talks on forest protection. In calling an open session for this purpose the foreman of the grand jury complied with a charge from Judge Meldrim, earlier in the term, that special attention be given to measures for protecting the forests and woodlands of the county. Together with practically all members of the grand jury, the meeting was attended by members of the county police force, representatives of the board of trade, attachés of the court, and others. In his opening talk Judge Meldrim expressed his determination to enforce the laws of Georgia forbidding persons other than those domiciled on land to set fire to the land and forbidding the latter to do this except between January 1 and March 1, and making the negligent or careless setting of fire to property a misdemeanor. Herbert L. Kayton, vice president of the Carson Naval Stores Co., Savannah, outlined the history of State forestry work in Georgia and discussed the present popular attitude in the State on the subject of forest fires. J. G. Peters, late assistant forester of the United States Forest Service, explained the cooperative system of forest fire protection provided for by the Clarke-McNary law and gave figures for forest fires in the United States in 1927. B. M. Lufburrow, State forester of Georgia, told of the forestry work being carried on in Georgia on the basis of State, Federal, and private funds amounting this year to $63,000, and of his dependence for enforcement of the forest fire protection laws on county police and on 296 nonsalaried fire wardens. S. H. Marsh, district inspector of the United States Forest Service, described the educational methods by which forest protection has been made a reality on the Shenandoah National Forest, with the result that this 500,000-acre tract, with 5,000 inhabitants, in 1927 had only 18 acres burned over. In conclusion the grand jury heard a talk illustrated with lantern slides by H. N. Wheeler, lecturer of the United States Forest Service.

Forest Fires in the United States

The damage caused by forest fires on lands under fire protection in the United States and the area burned were both much smaller in 1927 than in the previous year, according to figures compiled by the United States Forest Service. In 1927 the total area of protected land burned was 2,784,000 acres and the damage amounted to $4,297,000, as against 4,755,000 acres and $15,048,000 the year before. This improvement receives emphasis from the fact that there was an increase in the number of fires reported from 33,867 in 1926 to 35,300 in 1927.

On lands that were not protected the reports show a big increase in number of fires, damage, and area burned. In 1927, incomplete reports show, there were about 123,000 fires on unprotected areas that burned 35,747,000 acres and caused damage to the amount of $29,088,000. The previous year about 58,000 fires burned 19,561,000 acres and caused $11,864,000 worth of damage. The great increase was due in large part to the severe fire season experienced in some of the forest regions of the country. The fact that reports were more complete than those of 1926, however, had some effect in increasing the totals. The contrast between the great increases on the unprotected areas, of which there were 174,000,000 acres, and the decrease in all but number of fires on the protected areas, which totaled 296,000,000 acres, is a striking demonstration of the value of effective fire protection in saving the forest wealth of the Nation.

Fires reported for 1926 spread over 1.21 per cent of the total protected area of the United States; those reported for 1927 covered only 0.61 per cent of the protected area. The Middle Atlantic and Southeastern States made notable progress in reducing the proportion of protected area burned over; this proportion was 2.04 per cent for both regions in 1926, but in 1927 was only 0.41 per cent for the Middle Atlantic States and 1.30 per cent for the Southeastern States. The corresponding figure for the Central States in 1927 was 1.05 per cent, as compared with 1.45 per cent in 1926.

In 1927 the Gulf group of States had the greatest number of fires, 85,341 on the unprotected area and 12,989 on protected lands. The Gulf States also had the greatest area burned over, 18,337,000 acres of unprotected and 1,197,000 acres of protected land, and the greatest loss, $14,422,000 on unprotected areas and $998,000 on the protected lands.

Smokers were the leading cause of fires on the protected areas. They were responsible for 6,747 fires that burned over 507,000 acres and caused $752,000 damage. Incendiaries started 5,379 fires that burned 570,000 acres with a loss of $659,000. Brush burning caused 4,349 fires, lightning 3,903, railroads 3,732, camp fires 2,645, and lumbering 2,183. Miscellaneous and unknown causes accounted for the remainder of the total. Information as to the causes of fires on the unprotected areas is too incomplete to warrant tabulation.

About 20,000,000 additional acres of land were placed under systematic protection during the year.

State Foresters Indorse Industrial Forestry Extension

Twenty-nine State forestry organizations sent representatives to the meeting of the National Association of State Foresters held at Wooster, Ohio, October 1–4. Including various staff men from the States and representatives of the Federal Government, the active participants numbered 60.

A decision arrived at in this meeting affects the form of the estimates of the prospective cost of fire protection that will be submitted in 1929 by the State foresters of States cooperating in fire protection work under the Clarke-McNary law. Each of these State foresters will define the standard of fire protection that he believes to be practical in his State for the period 1930–1935 in terms of the figure to which he aims to reduce the percentage of forest land burned over in the State each year. This standard will be used by each State forester as the basis for his report as to the sums needed for fire protection in his State. A committee of the National Association of State Foresters is expected to work with representatives of the United States Forest Service in reviewing and reconciling the cost reports submitted by the individual State foresters.

The meeting discussed and unanimously approved the industrial forestry extension amendment to the Clarke-McNary law that has been introduced in Congress. This amendment would permit Federal cooperation with the forestry organizations of the various States in assisting forest industries and timberland owners, through investigation and advice, in the management of forest lands and in the harvesting and utilization of their forest products, with the view of encouraging and promoting reforestation.

Officers elected by the association are president, J. S. Holmes, North Carolina; vice president, Ben E. Bush, Idaho; and secretary, F. W. Besley, Maryland.

Pennsylvania Forest Inspectors Survey Burns

Paid fire crews can make themselves useful between fires by surveying burned-over areas, the Pennsylvania forestry organization suggests. In the Weiser forest district of Pennsylvania an effort has been made to get more accurate fire statistics by having forest inspectors survey all areas of more than 30 acres that were burned over this spring. Ordinarily one compass man was sent out with a helper who worked ahead and provided a foresight. Both men paced the distances. In a few cases fires were surveyed with the use of 100-foot steel tapes instead of pacing. On large fires two, three, or four compass crews were used in order to hasten the work. The field notes were sent into the district office, where the surveys were scaled off on cross-section paper and the squares inside the perimeter of each fire were counted to obtain the acreage. This work can be done more economically by using transparent drawing paper fastened over cross-section paper.

New Trailer for Carrying Fire Crews and Equipment

A new way of carrying water, men, and equipment to forest fires has been devised and successfully tried out by the North Carolina Department of Conservation and Development. It is an automobile trailer having a 300-gallon water tank and over the tank a tool compartment holding 12 small fire pumps, buckets, [illegible]se connections, axes, saws, rakes, hooks, backfiring fuses, and emergency food supplies for 20 men. The top of the trailer affords seating space for 10 men. The mud guards are arranged for foot rests, and in the center of the top between the two doors over the tank is a pipe, securely fastened to the tank, that serves as a hand hold. On the tongue of the trailer is mounted a double-action hand pump, which can be operated by a man sitting on top of the tank while a second man plays the hose.

West Virginia to Get Three New Towers

The forest fire protection budget approved in July by the West Virginia Game and Fish Commission for the ensuing fiscal year provides for three new steel observation towers and about 60 miles of telephone line. The largest of the towers will be 73 feet high and will stand at the crest of Stone Coal Mountain in Raleigh County. A 60-foot tower will be erected near Lone Star School, in Wyoming County, and one 47 feet high at Burning Rock, Wyoming County. Each of the towers will have an inside stairway and a glass-inclosed "crow's nest," and at the base a metal house to be used by rangers who stay at the observation point overnight. The construction of the three [illegible]wers will cost about $6,000.

A Market for Spruce and Balsam Boughs

The sale of spruce and balsam brush to be used for decorative purposes in cemeteries and as a protective cover for young nursery stock in city parks and on private grounds is reported by E. C. Mandenburg of the Michigan Agricultural Department to have reached large proportions in the upper peninsula of Michigan. The greatest demand is for boughs from 2½ to 3 feet long. The cutting is done in the fall and early winter. The brush is tied in bundles of convenient size by the woods owner or operator and is shipped in car lots of from 12 to 14 tons. The shipper is furnished with a printed contract and receives a price that affords a good profit. As much as 100 tons of the material has been shipped in one season from Palmer, Greenwood, and other upper peninsula points. The boughs are kept in cold storage at convenient points, and hold their foliage until well along in the spring.

This traffic, Mr. Mandenburg observes, not only should appeal to loggers but should interest timberland owners because it creates an opportunity of immediate profit from pruning timber.

California Gives Trees to Haiti

An assortment of California redwoods and of pines and other conifers native to California are to be planted this fall in Haiti, in the gardens of President Borno. At the suggestion of State Forester Pratt, Governor Young of California directed that the trees be taken from the State nursery and sent as a gift to the Haitian president, who is a tree enthusiast.

Quinebaug Park Made Accessible

The Quinebaug Pines State Park in the northeastern corner of Connecticut, about 1 mile south of Putnam, Conn., has been made accessible from the State road by the construction of a foot bridge across the Quinebaug River. The new bridge, formally opened by members of the Connecticut Park and Forest Commission on October 9, is of the suspension type, with piers of reinforced concrete and with rails and planking of creosoted timber.

This park was purchased by the State in 1923 to save from cutting a tract of veteran northern white pine that includes some trees well past the century mark, nearly 3 feet in diameter, and more than 100 feet tall. In addition to the old pines the park contains excellent younger growth. Heretofore no road has given access to the park.

Heavy Crop of Longleaf Seed in Texas

Longleaf pines in eastern Texas are yielding a heavy crop of seed this fall, for the first time in about seven years, and at the same time show a good setting of first-year cones. (It requires two years to mature the cones.) Texas foresters expect that unless adverse weather conditions intervene there will be as good a crop of seed of this species in 1929 as in 1928. Two good seed crops of longleaf pine in consecutive years, the Texas Forest Service reports, is an entirely new experience for this region, where the usual interval between good crops is from 5 to 7 years. In the expectation that myriads of naturally planted longleaf pines will sprout this year and next in the six or eight counties that make up the longleaf pine region of Texas, the State forest service is making a strong appeal to Texans not to endanger by careless use of fire an unusual gift of nature worth millions of dollars.

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Of the 600,000 forest tree seedlings raised in the Indiana State forest nursery for this spring's planting 300,000 were assigned to farmers, 200,000 to the stripped-over coal operations, and 20,000 to the State highway department, 75,000 being destined for planting on the State forest, parks, and game preserve. About half the trees were evergreens, the remainder being native hardwoods such as oak, poplar, and walnut.

The woodlot owners' association of Merrimack County, N. H., has a membership of 123. Twenty-three members planted 76,000 white and Norway pine, spruce, and ash this spring, and many others have commenced work to improve their woodlands. At the beginning of the year 1928, 42 woodland owners in the county had taken advantage of the Walker classification law on 1,718 acres.

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About 500,000 pine seedlings have been made ready in the nurseries on the Conroe and Kirbyville State Forests of Texas for planting this winter. Some of them will be sold at the cost of production to eastern Texas farmers and lumber companies, to be planted according to instructions of the State forest service; others will be used in demonstration plantings on the State forests. Longleaf pine makes up about 75 per cent of the stock in the two nurseries. Some slash pine has been grown, and more than 20 other kinds of trees have been raised for experimental purposes.

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One of the few individuals in New York State who have violated the State's conservation law by refusing to assist in fighting a forest fire when summoned by a fire warden recently paid judgment and costs amounting to $126.25.

The Arkansas Forest Protective Association wa formed at a meeting at Camden, Ark., October 8 The officers of the association are president, A. L Strauss, Malvern Lumber Co., Malvern; vice president, L. R. Wilcoxon, Crossett Lumber Co., Crossett and secretary-treasurer, William L. Hall, Hot Springs

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Three and one-half thousand acres of land in Ne York State was reforested this spring by timberlan owners and operators belonging to the Empire State Forest Products Association. One member organization, the St. Regis Paper Co. of Watertown, planted 1,500,000 trees and sold more than 1,000,000 to other concerns. Plantings by the association's members now amount to 18,531 acres.

NOTE.—A. B. Recknagel, forester and secretary of the Empire State Forest Products Association, points out that the item "Farmers Lead in New York Tree Planting," on page 1 of the July FOREST WORKER, failed to make it sufficiently clear that the planting figures given therein covered only the trees raised in the State forest nurseries. Professor Recknagel tells us that in addition to 1,500,000 State-raised trees the members of the Empire State Forest Products Association planted an equal number obtained from commercial nurseries.

Education and Extension

New Forestry Fellowship and Scholarship Fund at Yale

A fund of $20,000 for fellowships or scholarships has been given to the Yale Forest School by Mrs. William H. Sage, of Albany, N. Y., as a memorial to William Henry Sage, a graduate of Yale College in the class of 1865. Before his death Mr. Sage provided a fund of $300,000 for the erection of a building for the forest school in memory of his son, DeWitt Linn Sage, Yale, 1897.

Courses Dealing with Forest Products and Farm Woodlots at Virginia Polytechnic

The Virginia Polytechnic Institute, at Blacksburg, Va., has made provision for courses dealing with wood technology, industrial wood fibers, wood-using industries of Virginia, forest products, and farm woodlots. "This college has no intention of establishing a department of forestry to train foresters," writes President Julian A. Burruss. "It is, however, intensely interested in doing two things—namely, assisting the wood-utilizing industries of Virginia and assisting Virginia farmers to dispose of their forest products to advantage." J. W. O'Byrne has for several years been connected with the agricultural extension division of the college as farm forestry specialist. J. Elton Lodewick, recently of the faculty of the New York Sta[illegible] College of Forestry, will have charge of the courses in wood utilization. Allen H. Reid, a graduate of the Oregon Agricultural College and of the Massachusetts Agricultural College, will assist in work in connection with farm woodlots.

Denison University Plants Idle Lands

Denison University, at Granville, Ohio, began reforestation work this year on a large tract of land that it received as a gift within the past few years. The portions of this tract that do not adjoin the campus and are not suitable for building sites or athletic fields are to be planted with trees in cooperation with the State forestry department. This spring 15,000 trees were planted in permanent location and 50,000 2-year-old seedlings were lined out in a nursery. Norway spruce, Norway pine, Scotch pine, and Corsican pine made up this first planting and will predominate in those that follow. Both pure and mixed plantings will be made in order to study their relative value for reforestation purposes in the locality.

The Berkeley Campus as an Arboretum

By Woodbridge Metcalf, Extension Forester of California

The campus of the University of California is really a great arboretum containing fine specimens of many native and exotic trees and shrubs. These have now been introduced to the general public through the medium of neatly embossed aluminum labels attached to trunk or branch. Each label gives the tree's common and scientific names, the family of plants to which it belongs, and the country to which it is native.

The trees of the campus are an interesting company. Most people in the neighborhood of the university know that the Leconte Oak is of the coast live oak species and that the Hilgard Chestnut is of a species native to Italy, but many do not realize that the tall, creamy-barked Eucalyptus which graces West Field is a manna gum, that the largest specimen of island ironwood on the California mainland stands north of the university library, or that the little two-leaved pine near the Wheeler Hall steps is of the celebrated French species, maritime pine. The pines are particularly well represented with Monterey, Bishop, Torrey, Coulter, Digger, western yellow, Jeffrey, sugar, limber, and lodgepole of the species native to California and also jack, Norway, and northern white from the Lake States, longleaf and slash from the South, red and black from Japan, Austrian and Scotch from Europe, Canary from the island of that name, and Aleppo from the Mediterranean.

The spruces include Sitka, Colorado, Engelmann, white, Norway, Oriental, and a small grafted specimen of the rare weeping spruce of the Siskiyou Mountains. All three of the true cedars (*Cedrus* spp.) are to be found and several of the junipers, cypresses, and flat-leaved cedars are present. Among the fir trees white, lowland white, European silver, and Nordmann may be seen on the campus, and specimens of balsam fir, California red fir, and noble fir are being grown in the forest nursery. Douglas fir, which is not a true fir, is also represented on the campus.

The campanile until recently was surrounded by 12 weeping Sequoias, a variety of the California Bigtree developed in Belgium. Recently these have been removed and 12 fine specimens of western red cedar now surround the granite shaft. The severely trimmed trees on the plaza are London planes. Two dark green Irish yew trees stand guard at the president's house and two more stand before Bacon Hall. A similar post in front of Agriculture Hall is occupied by two Chinese junipers. Many hardwood trees from east of the Mississippi are to be found here and there on the grounds; a fine yellow poplar stands on the north side of West Field and across the creek are shingle oak, osage-orange, American elm, chestnut, and bigleaf shagbark hickory. Graceful birches, scarlet-leaved red gum, sturdy red oak, prickly honey locust, and fragrant sassafras are found on the grounds and within a few steps of each other may be seen Chinese elm, Japanese persimmon and zelkova, Norway maple, Australian ironwood and beefwood, and the Brazilian mayten tree.

In the angle between Hilgard and Agriculture Halls there are 60 different species of trees from many parts of the world. These have been grown from seed in the adjacent nursery of the Forestry Division or received from the United States Bureau of Plant Industry. Among them are a beautiful golden-flowered eucalypt from Western Australia, snow gum from Victoria, and a hybrid eucalypt developed in Algeria. Here also are two flowering cherries from Japan, maidenhair tree and two dainty-leaved maples from China, small specimens of Queensland nut and China wood-oil trees, Teneriffe juniper from the Canary Islands, longleaf pine from the Southern States, and persimmon and sugar maple from the East.

More than 250 labels have been made and affixed to the trees on the lower campus. The labeling will be extended to the slopes of Strawberry Canyon, where a large number of trees have been planted in groups. Last year many of the trees in the collection at Chico Forestry Station were labeled, and as soon as possible labels will be placed on the trees at the university farm; at Whitaker's Forest, in Tulare County; at Kearny Ranch, in Fresno; and on the new grounds of the university at Los Angeles. With the cooperation of Prof. H. W. Shepard and Miss K. D. Jones of the landscape division the shrubs also are being labeled on the various properties of the university throughout California.

The $10,000,000 building program now under way at the university necessitates the removal of many fine old trees; but the forestry, landscape, and botany departments are making every effort to replace these with others of the same species, so that the scientific interest of the campus may be preserved.

Cash Scholarships Awarded for High-School Forestry Essays

Cash scholarships of $150 and $100 went to the four boys and girls who won essay contests arranged this spring by the American Forest Week Committee of Oregon for students in high schools and in private schools of high-school grade. First and second prizes of these amounts were offered to the children of Portland and a duplicate set of prizes to children in the remainder of the State. First-prize winners also received silver trophy cups. Certificates of merit signed by the governor were issued to the runners-up. "Oregon and her future forests" was the subject of the essays, which were limited in length to 1,500 words and were given preliminary grading by principals of individual schools.

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Sixteen camps of the Four-H Clubs of California were visited this summer by Extension Forester Metcalf, who conducted forestry trips and camp-fire programs for nearly 1,000 boys and girls.

The School Forests of the Berry Schools

The Berry Schools for rural boys and girls, at Mount Berry, Ga., measure their school forests not in acres but in thousands of acres. Forest Manager E. I. Terry made a survey during the past summer of 10,840 acres of land owned by the schools, and classifies it as follows: Campus and farm land, 1,896 acres; mountain forest, 2,924 acres; merchantable pine timber, 757 acres; immature pine areas, 2,100 acres; bottom-land hardwoods or scrub-oak thickets, 609 acres; grasslands, 2,554 acres. The mountain forest, Mr. Terry writes, is a mixed type of hardwoods and pine from which all merchantable timber has been removed, and is now in need of an improvement cutting followed by a period of recuperation. On the areas classed as merchantable pine timber—mostly loblolly, with some longleaf—the trees more than 12 inches in diameter at breast height make up a stand of 4,000,000 board feet. The areas of immature pine include 1,500 acres of large polewood, 300 acres of small polewood, and 300 acres of reproduction, and for the most part are expected to become merchantable in the course of the next 10 to 20 years. On open fields, not used for agriculture, that form about one-fourth of the area surveyed, natural restocking with pine is prevented by the heavy growth of grass. Mr. Terry believes that perhaps 10 or 15 per cent of these fields may be successfully reseeded from nearby standing timber if the turf is harrowed in the fall of seed years. The remainder, he states, may best be reforested by planting.

A purchase made since the survey reported in the foregoing adds about 4,000 acres to the Berry Schools domain.

The agricultural instruction in the schools includes a course in farm forestry.

Mississippi Puts on Three Fair Circuits

Exhibits shown at Mississippi fairs this fall by the State forest service, in cooperation with the State extension forester, aimed to familiarize the people of the State with the great variety of materials produced by the local forest-dependent industries. In addition to lumber samples illustrating grades and species, and specimens of naval stores produced by cupping and by distillation, they included samples of stock used in furniture manufacture, cabinet wood, mill work, sash frames, interior trim, charcoal, acetate of lime, wood alcohol, automobile spokes, shuttle blocks, broom handles, agricultural tools, and pulp and paper. Tools of different types used in naval stores production were shown also, and tree stumps illustrating old and new turpentine methods.

Three duplicate exhibits were prepared, each to be shown at several fairs. The men who were given charge of the three sets were W. H. Humble, former assistant extension forester of Louisiana; Charlie R. Ashford, a graduate of the State agricultural college; and D. C. McCartney, a former assistant district forest ranger of Louisiana who is now studying forestry at the Louisiana State University. To make the most of the educational value of the exhibits it was arrange that Mrs. D. P. Edgerton, State supervisor of forest education, should visit schools in the towns where t fairs were held and give the children an introducti to the exhibits.

Two Years of Forestry at Ohio Stat University

The first half of a 4-year course in forestry is offered by the Ohio State University. The plan is have students completing the two years' work transf to other institutions where they can complete a stan ard 4-year course. The university's division of fo estry has its headquarters in the Horticulture an Forestry Building.

Motorized Educational Campaign in North Carolina

Nine reels of forestry and game educational films ar touring North Carolina in a truck equipped wit generator, projector, and screens, escorted by Willia L. Nothstein, a graduate of the Pennsylvania Stat Forest School. The new, specially designed truck the property of the North Carolina Department c Conservation and Development, was first put int service at the annual meeting of the North Carolin Forestry Association in September of this year. Fo the remainder of September and for October a program of showings at fairs was arranged. The November and December schedule was for showings in school of district 1 (which has headquarters in Asheville and before Boy and Girl Scouts, Four-H Clubs, an other organizations in that district.

Pennsylvania State Nursery Produc Exhibited at Fairs

Tree seedlings from the State forest nurseries of Pennsylvania made a stage appearance this fall at five fairs i the Lackawanna forest district, with the result that District Forester H. M. Nicholas received a large number o applications for planting stock. In addition to potte seedlings representing various kinds of stock offered fo distribution from the State nurseries the exhibit show at the fairs by Mr. Nicholas included a display of 50 native woods, specimens of northern white pine and gooseberry leaves affected with the blister rust, and specimens of pine attacked by the white pine weevil.

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Harvey Dengler, a Four-H Club boy of Utica, N. Y., won a prize of $25 this year with an exhibit of leaves, twigs, and fruit of 15 kinds of New York State trees. The prize was offered to members of the Four-H Clubs of the State by the Empire State Forest Products Association, with the understanding that the money would be used to pay the winner's expenses on the 4-day reforesting tour conducted by the New York Conservation Department in cooperation with the State farm bureau organization.

Forest Service Notes

Grazing and Watershed Protection Experiment on the Manti National Forest

On a watershed at the head of Ephraim Canyon, nti National Forest, Utah, the improvement in egetative cover brought about by five years' protecon from grazing, which had formerly been excessive, esulted in a reduction of 54.6 per cent in run-off uring the summer rainy period and a reduction of 6.2 per cent in erosion during that period. The nprovement in vegetative cover appeared to have ut little effect on run-off from melting snow. At the me when the cover was badly depleted summer rains ere responsible for 88 per cent or more of the average nnual erosion, although they caused only about 5 per ent of the yearly surface run-off.

This watershed was chosen by the Great Basin Range xperiment Station in 1915 as the field of experiments o determine what is the rôle of herbaceous and shrubby egetation in the control of erosion and the regulation f stream flow, and what regulation of grazing is necesary to maintain adequate watershed protection. It as an area of 11.24 acres. A main drainage channel averses it from end to end, and the terrain slopes ith this channel from both sides. The mean gradient f the watershed is about 17 per cent. In 1915 it had bout 16 per cent of a full vegetative cover.

Each year from 1915 to 1919, inclusive, the area as closely grazed by a band of sheep, usually about first of August. Since that time it has been allowed mprove. By 1923 its vegetation had increased to 0 per cent of a complete cover. Beginning in 1926, has been grazed by sheep late in September, because oderate to light late grazing is not detrimental to vegetion, and the trampling of the sheep has a beneficial fect in getting seeds of forage plants into the ground.

A second watershed on the canyon, 8.97 acres in tent, has been studied as a check area. This watered, designated as area B, has a slope fairly uniform direction and a mean gradient of about 15 per cent. 1915, when the vegetative cover on area A (deribed in the foregoing paragraphs) had a density of 16 er cent, that on area B had a density of 40 per cent. ike area A, area B was closely grazed during the period 915–1919, inclusive. Since then, while area A has been lowed to improve, area B has been grazed to hold the ensity of its vegetation stationary at 40 per cent.

During the period 1915–1919, inclusive, when vegetion covered only 16 per cent of area A, but covered 0 per cent of area B, there was 7.14 times as much n-off and 8.76 times as much sediment removed from as from B. In 1927, when there was approximately 5 per cent of a complete cover on A and still only a 0 per cent cover on B, there was only 2.01 times as much run-off and 2.52 times as much sediment removed from A as from B.

The figures that have been given for reduction of run-off and erosion due to summer rains on area A are based on a comparison of averages for the years 1915–1919, inclusive, with averages for the years 1923–1925, inclusive. Records taken in the year 1927, after still further improvement in vegetative cover, show that in that year summer run-off was 71.8 per cent less, and erosion due to summer rains 71.2 per cent less, than the average for the period 1915–1919.

In the summer of 1928 rainfall on the experimental areas was not sufficiently heavy to cause run-off.

California District Collects Seed

By E. E. CARTER, United States Forest Service

In anticipation of the establishment of a forest nursery on the Lassen Forest, Calif., in the spring of 1929, forest officers on the Lassen had a busy time this fall collecting cones and extracting seed. Western yellow pine and Jeffrey pine cones were gathered from the tops of trees felled in lumbering operations on the forest. The collecting season was only about three weeks; the cones could not be taken before the seed were ripe, and after the seed were ready the dry fall weather made the opening of the cones and release of the seed only a matter of days. Big motor trucks brought hundreds of sacks of cones to the forest headquarters at Susanville. There canvas sheets were spread on the ground and the cones spread on them. The usual California sunshine did its work. The most tightly sealed cone yielded in a few days, and spread its scales. A little shaking in a screened box brought the seed rattling out.

Those who are accustomed to handling cones or seed of such trees as Norway pine, Douglas fir, or red spruce would feel the bigness of the West reflected in the size of these Lassen products. The cones of the Jeffrey pine especially seem large, and its seed are nearly as large as the pinon nuts of the Italian's street stand. The empty cones make good kindling, but are not much in demand in a town where dry pine box factory waste is readily available.

Now the Lassen, with over 600 pounds of seed, about half western yellow pine and half Jeffrey pine, is ready to sow seedbeds next spring. Next summer should see between a quarter million and a half million trees, perhaps an inch high, starting bravely on the job of repairing the losses from past fires on the lands now in the national forests of northern California. Two seasons of care, and they will be ready to be planted in their permanent places on the fire-opened mountain slopes. Their tender infancy will be past. They must withstand drought, heat, cold, insects, and diseases. But the only thing they will really fear is fire.

Seed Soaked in Sea Water Remain Good

On the Tongass National Forest, in southeastern Alaska, Ranger R. F. Taylor surmises that a large part of the tree seed crop is wasted by being carried out to sea, but observes that the sea "casts up some of its dead." While cruising timber in Thorne Arm last fall Ranger Taylor found proof of an old-timer's story in the form of a long windrow of spruce and hemlock seed deposited at high tide line. The seed seemed to be in good condition, with wings still intact, and gave no indication of having been soaked very long.

Having no opportunity to gather any of this seed, Ranger Taylor experimented by soaking in a pan of sea water, set where it would remain cold but would not freeze, a quantity of seed collected earlier in the year. Lots of 100 of the seed were taken periodically from the water and germinated on a blotter. Results were as follows:

Number of days in sea water and per cent of germination

2	47
3	53.8
4	48
5	27.07
6	28.26
12	16

A check test with unsoaked seed gave 44 per cent germination.

After five or six days' soaking a good proportion of the seed sank to the bottom of the pan. Thus it appears probable that many of the seed returned to shore by the waves, already extracted and ready to be collected or whirled back into the woods by the first breeze, have suffered no sea change that makes them incapable of germination.

Forests While You Wait

By Thornton T. Munger, United States Forest Service

Trees on the Siuslaw National Forest, Oreg., that were planted with grub hoes 16 years ago are now being measured with calipers and hypsometers and their contents computed in board feet and cords. The erstwhile "planting project" on the lower slopes of Mount Hebo has become a forest with but a short wait. Bracken fern, salal, and blackberry have given way to serried ranks of Douglas firs some of which are 45 feet high and as much as 8, 10, or even 12 inches in diameter.

On an area planted in the spring of 1912 with 1–1 Douglas firs spaced 6 by 6 feet, a permanent growth plot was established recently to see just what this wood-fiber factory was doing on this favored site. In a fairly well stocked, but not uniformly fully stocked, part of the 8,000-acre plantation 1 acre had 555 living Douglas firs, with a number of volunteer red alder, cascara, and tree willows besides. Of these Douglas firs 332 were 5 inches in diameter or larger, and 30 were 8 inches or larger. Their aggregate volume was 1,356 cubic feet—about the equivalent of 15 stacked cords. This forest, still in its teens, is already producing an average of a cord an acre a year and is really only beginning to go strong. The better trees are now shooting up a yar year, their lower branches are dying off, and they a expanding to very usable diameters.

Meanwhile the fire hazard, which has been acu in this "fern patch" since the original forest was kill some 75 years ago, is diminishing, for the bracken fe and other herbage that supplied the tinder are fa being shaded out. (The bracken was by act measurement 11½ feet tall in spots.)

National Forest Roads and Trails

Of the $5,441,434 income from the national fore in the fiscal year 1928 more than half a million will spent on national forest roads and trails, in accordan with the act of Congress that foreordains one-tenth the national forest receipts to this purpose. The fu is divided among the national forests, grouped accor ing to States, in the same proportion in which th contributed to the receipts. Of the fund derived fro last year's receipts $136,020 goes to the nation forests in California, $68,660 to those in Orego $67,863 to those in Idaho, and $57,601 to those Washington.

The total amount of Congressional appropriatior including the "10 per cent fund," available for co structing and maintaining national forest roads a trails during the present fiscal year is $9,503,359.

Through the expenditure of money appropriated b Congress for road and trail purposes 1,538 miles roads and 6,462 miles of trails were constructed on th national forests or adjacent land in the year endi June 30, 1928. Including that year's work, the have been completed 14,823 miles of national fore roads and 39,596 miles of national forest trails. Th roads and trails have been constructed at a t expense of $89,597,405, of which $72,717,912 was co tributed by the Federal Government and $16,879,4 by cooperating agencies.

At the beginning of the fiscal year 1929 the Bure of Public Roads had constructed a total of 4,113 mil of national forest roads, at an average expense $13,297 a mile. The cost of these major forest roa ranged from an average of $24,613 a mile in Californ to an average of $1,203 a mile in South Carolin The minor national forest roads constructed up to th date (these are built by the Forest Service) totale 10,710 miles and cost on the average $1,350 a mil The cost of these minor roads was greatest in Alask where it averaged $3,796 a mile, and least in Port Rico, where it averaged $72 a mile.

Of the forest highway systems that have been approve by the Secretary of Agriculture as corresponding to th needs of the national forests for the 10-year period endin in 1938, 23 per cent is not yet in existence, 39 per cent now represented by roads of unsatisfactory type, and 3 per cent has been constructed to a satisfactory standar Of the projected systems of trails 27 per cent is sti nonexistent, 8 per cent is classed as unsatisfactor and 65 per cent has been satisfactorily completed.

Relation of Stump Diameter to D. B. H. in Western Pines

A tip as to how western yellow pine and western white pine trees can be scaled in absentia comes from M. I. Bradner, chief of forest products in the Missoula (Mont.) office of the Forest Service. In the course of a study of woods waste, conducted on national forests of northern Idaho, it developed that in western yellow pine the diameter inside the bark of a stump (the stumps were usually less than 18 inches in height) was practically identical with the tree's diameter at breast height outside the bark. In the case of western white pine it was found that the diameter outside the bark at breast height was less than the diameter inside the bark of the stump, the differences being approximately as follows:

Diameter of stump, inside bark, 10 to 14, 15 to 19, 20 to 25, and 26 to 32 inches.

Reduction for D. B. H., outside bark, −1, −2, −3, and −4 inches.

Stumps having diameters inside bark of more than 32 inches, Mr. Bradner says, must be judged individually, since in this class there is a wide variation in form due to stump rot and other butt deformities. Here the reduction varies from 0 to 6 inches.

While the figures just given may not hold good over the entire range of western yellow pine and western white pine, they give at least an interesting lead to be followed wherever the volume of trees of these species has to be determined from stumps.

Wood Pulp from Extracted Pine Chips

Wood chips from which rosin has been extracted by distillation may be used in the manufacture of wrapping paper and of the cheaper grades of composition boards, the Forest Products Laboratory has determined by a series of experiments. Pulps from the extracted wood were, however, found to be unfit for the production of strong first-quality papers. Not only was the pulp from the extracted chips found to be inferior in strength qualities to pulps from unextracted wood, but the yields were somewhat lower. The quality and yield of the extracted-wood pulps can be improved by mixing green wood with the extracted wood to be pulped.

General Forest News

Woodgate Rust Leads to Hard Pine Quarantine in New York

Interstate movement of Scotch pine and certain other hard pines from nine counties of northern New York State is prohibited by a quarantine announced by the Secretary of Agriculture, effective November 1, because of a disease known as the Woodgate rust. The origin of this disease is unknown. No disease exhibiting exactly the same characteristics is known to the Department of Agriculture to have been discovered elsewhere in the United States or in any other country of the world. The name Woodgate has been given to the disease because the first case reported was at Woodgate, N. Y Two sections are known to be heavily infected, one just southwest of the Adirondack Mountains and one in the extreme northeastern corner of the State. The counties from which interstate shipment is forbidden are Clinton, Essex, Franklin, Hamilton, Herkimer, Jefferson, Lewis, Oneida, and St. Lawrence.

The disease causes galls or swellings on the trunks and limbs of the trees attacked. Following this the parts of the tree above the galls die, or else "brooms" are produced that destroy the value of the pine for lumber. The disease attacks the host with extreme virulence. One tree 15 feet high was found by actual count to have more than 18,000 galls. Control is especially difficult because the rust spreads directly from tree to tree, without the intervention of an alternate host.

All hard pines appear to show a certain degree of susceptibility to Woodgate rust infection, but several important species including Norway pine and pitch pine have not been proved capable of supporting the fungus long enough to harbor and disseminate the disease. These species, therefore, are not covered by the quarantine order, which affects the following pines: Scotch, Canary Island, slash, Japanese red, Corsican, stone, western yellow, Monterey, loblolly, and Jersey (Virginia). None of these species is native to New York State, but several of them have been widely introduced there. The Scotch pine, the species attacked by the Woodgate rust with particular virulence, has proved valuable for reforestation in New York and in the Northeastern States.

Gipsy Moth Quarantine Revised

Fifty towns of Vermont, Massachusetts, and Connecticut heretofore designated by a quarantine notice of the Department of Agriculture as lightly infested with the gipsy moth are added to the area designated as "generally infested" by a revision of the quarantine effective October 1, 1928. The area affected by the change totals 245.66 square miles in Vermont, 359.24 square miles in Massachusetts, and 976.44 square miles in Connecticut.

The revision of the gipsy moth and brown-tail moth quarantine also modifies regulations as to interstate movement of Christmas trees and greens. Under inspection and certification, Christmas trees and greens originating in the lightly infested area may now be shipped from the generally infested area to points outside the territory under regulation.

Wood Preservative Industry Grows

Continued growth of the wood-preserving industry in the United States is shown by reports for the year 1927 sent by all the testing plants to the American Wood Preservers' Association and the Forest Service. Preservative treatment was given to 345,685,804 cubic feet of wood, or 19 per cent more than was so treated in 1926. Crossties alone showed an increase of 34,631,906 cubic feet in quantity subjected to preservative treatment in 1927 and poles an increase of 14,517,518 cubic feet.

In 1927 the wood-preserving industry used a greater quantity of creosote than ever before—219,778,430 gallons. The use of petroleum as a diluent for creosote increased during the year by more than 41 per cent. During the year 22,911,134 gallons of petroleum was used for this purpose, mainly in the treatment of crossties. The consumption of zinc chloride by the treating plants dropped 10 per cent in 1927, totaling 22,162,718 pounds. The 1,389,465 gallons of paving oil used by the plants during the year was only a little more than half the quantity they had used in 1926.

During the year 1927 the consumption of domestic creosote by treating plants in the United States rose by 38,426,855 gallons and that of imported creosote fell by 4,381,605 gallons.

Ten new treating plants were constructed in the United States in 1927, as against two abandoned. The number of plants that were active in 1927 was 187, or 7 more than were reported active in 1926. At the close of 1927 there were 195 treating plants in the country, of which 134 were commercial plants that treat wood for sale or by contract, 33 were plants owned and operated by railroads for the treatment of crossties and other kinds of right-of-way material, and 28 were plants owned and operated by public utility corporations, mining companies, or the Government.

Naval Stores Consumption, Export, and Import

Exports of turpentine from the United States during the fiscal year of the naval stores industry ending March 31, 1928, were greater than in any other season since 1913–14. According to figures supplied by the Bureau of Foreign and Domestic Commerce 16,494,551 gallons were exported in the season of 1927–28, as compared with 12,794,850 gallons in the season of 1926–27 and with 11,361,500 gallons in the season of 1925–26. Exports of rosin in the season of 1927–28 totaled 1,373,411 barrels, as compared with 1,129,614 barrels in the season of 1926–27. Imports in the 1927–28 season included 9,762 gallons more of turpentine and 19,142 barrels less of rosin than in the preceding season, the total imports being 316,348 gallons of turpentine and 3,625 barrels of rosin.

Industrial consumption of turpentine in the United States is reported by the Bureau of Chemistry and Soils to have increased from 5,617,049 gallons in the calendar year 1926 to 5,838,298 gallons in 1927 Domestic consumption of rosin decreased from 984,085 barrels in 1926 to 906,951 barrels in 1927. Consumption of mineral thinners rose from 52,637,739 gallons in 1926 to 59,168,760 in 1927.

Fire Loss Slips Below Half Billion

The American people seem to have handled fire with somewhat greater care in 1927 than formerly, according to a report of the National Board of Fire Underwriters. For that year property losses in the United States due to fire were estimated by the board at $478,245,620; for 1926 they had been estimated at $560,548,624. This is the first reduction the board's estimates of annual fire loss have shown since 1919. Statistics compiled by the New York Journal of Commerce indicate continued improvement this year, with $9,000,000 less fire loss during the first seven months of 1928 than in the corresponding period of 1927.

Municipal Camps on National Forests of California

Thirteen municipal camps are maintained on the national forests in California by cities of that State in cooperation with the United States Forest Service. The use of the land occupied by the camps is furnished free of rental charge by the Forest Service; the improvements are maintained and the camps operated by the municipalities without profit for the benefit of their citizens. Because the guests take part in the operating activities, a vacation in one of these camps may be had at a cost of about $1 a day, exclusive of transportation.

Guests are housed in well-ventilated cabins or tent houses furnished with cots and mattresses. As a rule there is daily mail service. Stores and libraries are maintained, and a trained nurse is on duty at each camp. Pack-train or hiking trips and nature-study hikes are arranged by the camp staff. Nearly all the camps have swimming pools as well as athletic fields. Each day ends with a camp-fire entertainment put on largely by the guests.

Where the demand for admission to the camps is heavy, guests are usually limited to a stay of two weeks. Some camps provide for family parties, some for organizations such as the Boy Scouts and the Camp Fire Girls. Some designate certain periods for family parties and other periods for different organizations. Since the camps are from 25 to 300 miles away from the municipalities that maintain them, special arrangements are made for transportation.

The San Francisco camp is near Hetch Hetchy; the Oakland camps are located near Quincy and Groveland, and those of Berkeley at Echo Lake and Harlan Flat; Sacramento's camp is along the Placerville-Tahoe Road, and Stockton's is at Silver Lake above Jackson. The camps maintained by the southern California cities are all in the mountains of that region, except for the "High Sierra" Los Angeles camp, which is on the Inyo National Forest above Bishop.

Ribes in Relation to Forest Practices

Field studies of Ribes ecology by the office of blister rust control, Bureau of Plant Industry, indicate the feasibility of decreasing Ribes flora in the western white pine type through forest management. Conclusions tentatively drawn from the work include the following:

Ribes constitute a temporary and not a permanent part of the flora of well-stocked western white pine stands. Dense and well-distributed stands of western white pine reproduction established after cutting or fire free themselves from Ribes in from 10 to 40 years, according to the stand density and the number of Ribes present. This may be due to increasing shade on the forest floor, to root competition, or to some other factor not yet recognized.

Ribes appear in the western white pine type following disturbance of the ecological conditions existing in a well-stocked stand, as brought about through the partial or complete removal of the stand by fire or logging, with attendant partial or complete destruction or removal of the duff. A very light fire that destroys only a portion of the litter in such a stand, or any other disturbance of the forest floor conditions without an opening in the canopy, will cause Ribes seed to germinate. The degree of survival of such seedlings is as yet unknown.

Ribes seed apparently are not disseminated over long distances, but may remain viable in the duff or top soil for long periods. When conditions are favorable the stored seed germinate and establish a new population on the area. These facts give added value to the removal of Ribes plants from an area before seeding has taken place.

The complete destruction of the duff as in very hot fires that burn to the mineral soil results in the establishment of fewer Ribes than partial destruction of the duff as in light fires. Generally speaking, a fire hot enough to destroy the possibility of western white pine reproduction for many years also prevents the establishment of the Ribes.

Because of lack of forest cover, certain small areas in a forested region constitute permanent rather than temporary Ribes sites. The most important of these is the stream type, or narrow belt of brush growing along streams. Secondary permanent Ribes sites are spots in the forest where the forest cover is permanently broken owing to such causes as rock outcrops and swampy places.

Weather Forecasts on the Fire Line

While the Jamesburg, Calif., fire of 1928 was burning its way over approximately 14,000 acres of brush and timber on the Santa Barbara National Forest and adjoining land, Forecaster Gray of the San Francisco office of the Weather Bureau made daily forecasts from an emergency station close to the fire. Each evening he gave the forest officers forecasts of wind direction, approximate velocity, and humidity for the following night and day. Forest Supervisor Mendenhall reports that Mr. Gray's accurate forecasts were a great help in backfiring.

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A very light crop of Douglas fir cones is reported from western Oregon for the fifth consecutive year.

Foreign Notes

Gazogènes

The August, 1928, number of the Bulletin of the Central Forestry Society of Belgium is given up entirely to a discussion of gazogènes, or apparatus for extracting gas from wood, charcoal, wood briquettes, etc., as a substitute for gasoline in the operation of motors. An article in this number by M. Alfred Théodor contains a clear and interesting account of the work that has been done in developing such apparatus for use in automobiles, and of the problems involved. This use of charcoal and wood waste has been so far developed in France and Belgium that in automobile shows it has become customary to include a section for machines operated by gazogènes. The occasion for the special number of the bulletin devoted to this subject is an exposition covering methods and apparatus for extracting and using gas from forest materials, held in September at Grand Espinette on the road between Brussels and Waterloo. Over this historic route, according to the plans of a committee headed by the vice president of the national forestry board, the gazogène trucks and automobiles of various makes were to contest for honors and visitors to the fair were to be transported to and from Brussels in gazogène autobusses.

Federal Aid for Swiss Forest Roads

Under a law of 1902 the Federal Government of Switzerland contributes up to 20 per cent of the cost of roads and aerial tramways built for the primary purpose of getting out timber from the forests, both private and publicly owned. (The area of Federal forests is insignificant.) During the 25 years 1903–1927 Federal contributions for this purpose amounted to $1,375,000, and the total cost of forest roads and tramways constructed totaled $7,372,000. The forest area of Switzerland is about equal to that of Massachusetts or Maryland.

Good Returns from Timber Management of French Government Forests

A report on the management of French Government forests in the June number of the Bulletin of the Forestry Society of Franche-Comte gives the production and gross income in recent years as follows:

	Area	Production	Revenue [1]
	Hectares	*Cubic meters*	*Francs*
1913	1, 216, 578	2, 798, 600	32, 497, 000
1925	1, 429, 882	3, 503, 598	226, 245, 000
1926	1, 458, 909	3, 642, 534	254, 897, 000

In a normal year the cost of management is figured at about 13 per cent of receipts and the net income per hectare at about 164 francs. The productive portion of the Government forests is about 1,060,000 hectares, the rest being lands recently reforested or in process of reforestation, protection forests, etc. (A hectare is 2.47 acres.)

These financial results are obtained under management plans that provide for sustained yield, the kind and quantity of timber cut on each forest being very strictly regulated.

Returns from forests belonging to departments, communes, and public establishments for certain years are as follows:

	Area	Production	Revenue [1]
	Hectares	*Cubic meters*	*Francs*
1912	1, 960, 600	4, 639, 000	38, 484, 000
1925	2, 208, 400	5, 746, 961	229, 200, 000
1926	2, 208, 500	5, 883, 145	394, 446, 000

[1] In considering the increase in revenue it must be remembered that the exchange value of the French franc has greatly decreased since 1913.

These forests, also, are managed by the Administration of Forests and Waters, but with some restrictions. They can not be managed solely from the point of view of general public interest. The desires of communes, their resources, and the local needs have to be given special consideration. Communal forests in France have less large timber than the Government forests and firewood is a very important part of their output. For these reasons the returns per acre are not nearly so great as from the Government forests.

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According to "Maderil," a timber trade journal of Buenos Aires, the present Argentine Minister of Agriculture is taking a more active interest than his predecessors in forestry matters. He has recently sent a party of five advanced students from the University at Buenos Aires to the Chaco, to work under the direction of two Russian forest engineers in making volume and yield tables and studies of the laws of tree form and growth. He has also named a commission of engineers to develop plans for the study and testing of Argentine woods.

Swiss Scientist Writes of American Soils

Dr. G. Wiegner, professor of soil science at the Federal Polytechnic School at Zurich, in an article on a trip through America in 1927, has the following to say about American forest soils:

In all the excursions that we took we found no soils suffering from severe lixiviation (the removal of the fertilizing principles in the upper layers) and none of the podsolized soils that are so prevalent in northern Europe or the mountain regions of Switzerland. In the mountainous regions of the United States, the most that could be found in the way of podsolized soil was a type in which had taken place a slight displacement from top to bottom of aluminum and iron; nowhere was there found a layer of gray sand such as occurs in true podsol soil. Even in the Canadian part of the Rocky Mountains, in Jasper National Park, I found the lixiviation very slight; I had formerly thought it much more severe. Furthermore, the danger of lixiviation and of loss of fertilizing material is much less in America than with us, even in humid regions. I did not find acid humus anywhere in the forest. The Americans exploit their forests without much care. In Europe we have the idea that after clear cutting on a grand scale the soil must suffer greatly. And that is really the case with us; clear cutting in many regions of Europe where the climate is humid results in deterioration of the soil and loss of fertilizing substances. But in this respect, as in others, America has been more favored by nature than Europe. The formation of podsol soil is slight and this loss of fertilizing elements is never so severe as with us.

Canadian Fire Losses Reduced

Forest fire losses in Canada in 1927 are reported by the Minister of the Interior to have been the lowest ever recorded. During the calendar year 3,766 fires were reported. These fires burned over an area of 481,373 acres and caused damage and loss estimated at $1,396,055. This is about 20 per cent of the loss suffered in 1926. Heavy snowfall in the preceding winter with abundant rainfall and cool weather through the spring practically did away with the usual period of fire danger in the month of May. Frequent showers during the summer contributed to unusually favorable conditions throughout the Dominion except in the northern parts of Alberta and Saskatchewan and the valley of the Mackenzie River, where the summer season was very dry and considerable areas were burned over. Although weather conditions had a large influence in the reduction of fire loss, a great part of the gain is credited to improved organization and to greater care on the part of the public in using fire in the forests.

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Technical forestry education in Sweden is 100 years old this year. The centennial celebration planned to be held this fall included exercises at the Royal Forest High School, near Stockholm, and the issuance of a special de luxe number of the Journal of the Swedish Forestry Society.

Shelter Belts Help the Canadian Farmer

Although raspberries do not grow on forest trees, it is by grace of the work of foresters that they are now being raised on many farms of the Canadian prairies. Twenty-five years ago, says the Canadian Department of the Interior, in the Prairie Provinces the majority of farmers made but little attempt to grow many vegetables other than potatoes, only a few planted small fruits such as currants and raspberries, and the growing of apples and plums was practically unheard of. Since 1901 the Dominion forest service has been campaigning for the planting of trees on the prairies, and as a result many thousands of prairie farms are now protected by well-established shelter belts. Last year an inspection of 7,600 farms on which shelter belts had been established showed that 6,800 had good vegetable gardens, 2,700 were growing small fruits, and about 600 were experimenting with apples or plums or both.

On the Dominion Government's nursery station at Indian Head, Saskatchewan, apple and plum trees planted nearly 20 years ago with shelter-belt protection have borne fruit regularly.

Planting Areas Established on Scotch Deer Forests

The deer forests of Scotland included 1,975,209 acres in 1883 and since then have taken in more than 1,454,791 additional acres, according to Dr. J. D. Sutherland of Edinburgh. In a recent address reported by the London Times Doctor Sutherland explained that these deer-stalking lands are not well forested, containing not more than 45,000 acres of inclosed woodland. To find out the prospects for growing timber on these lands the forestry commission ordered an examination of 38 areas totaling 337,155 acres. Only about 20.3 per cent of the areas examined was found to be plantable. Twelve areas totaling 88,215 acres, of which less than one-third is reckoned as plantable, were acquired by the commission for purposes of afforestation.

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Forest industries of Ontario now represent an investment of $225,000,000, the provincial department of forestry reports. They employ nearly 30,000 people and have an annual pay roll of over $30,000,000.

Personals

James Girvin Peters, assistant forester of the United States Forest Service in charge of public relations, died October 9, 1928, in Camden, Ark. In his 25 years' work in the Forest Service, which he joined immediately after leaving Yale with the second class of graduates from the Yale Forest School, Mr. Peters made a remarkably individual contribution to American forestry. The Federal Government's cooperation with State Governments in forestry work, inaugurated under the Weeks law and later amplified through provisions of the Clarke-McNary law, was under his charge from its beginning. To this work he brought the even judgment, the spirit of fair play, and the tact that were needed to insure its best success. During his lifetime forestry work under the cooperative plan made notable progress. It was to take part in a meeting looking to the adoption of a forestry policy by the one forested State still without a forestry organization that he made the trip to Arkansas which closed with his death.

John W. Keller, since 1920 chief of the bureau of forest extension, Pennsylvania Department of Forests and Waters, has joined the State's highway department. He will have charge of roadside planting and the maintenance of roadside trees, and of the planting of trees, vines, and shrubbery for the protection of steep slopes along highways. Charles R. Meek succeeds Mr. Keller, and Mr. Meek's position as assistant chief of the bureau of forest protection has been given to Horace B. Rowland, a district forester of the Cornplanter forest district. R. R. Houpt, assistant forester in the Michaux forest district, has been made district forester in the Cornplanter forest district, with headquarters at Warren.

R. W. Graeber, extension forester of North Carolina, has moved his headquarters from Statesville to the North Carolina Agricultural College, Raleigh.

Rutherford H. Westveld, assistant silviculturist of the Pacific Northwest Forest Experiment Station, has accepted a position for the coming year on the forestry staff of the Michigan Agricultural College.

C. A. Gillett, extension forester of North Dakota, has returned to Cornell University for a year of graduate study. During the year 1928-29 he will assist Extension Forester Cope of New York in field work.

Bernard S. Meyer has resigned as associate forest ecologist, Central States Forest Experiment Station, and has resumed teaching in the Department of Botany, Ohio State University.

Charles M. Genaux has resigned as assistant in forestry at the State College of Washington in order to study for the master's degree at the University of Idaho.

A. P. Kelley has resigned as associate forest ecologist at the Allegheny Forest Experiment Station, to engage in investigative work at the Boyce Thompson Institute for Plant Research, Yonkers, N. Y.

H. C. Mitchell, formerly extension forester of Mississippi, has returned to the State as assistant State forester. Mr. Mitchell devoted the past school year to work at the School of Forestry and Conservation, University of Michigan, for which he received the degree of master of science in forestry.

Warren W. Chase, a master of science of the University of Minnesota, and George W. Craddock, a 1927 graduate of the University of California, hold the Baker & Bidwell research assistantships in the forestry division of the latter institution this year. Mr. Chase will conduct a study of redwood bark, and Mr. Craddock will study the succession of vegetation following burns in the foothill chaparral country.

Clinton G. Smith, assistant district forester in charge of lands for the Eastern National Forest District, has been transferred to the supervisorship of the Cherokee National Forest, Tenn.

R. G. Wheaton has resigned as assistant silviculturist at the Northeastern Forest Experiment Station and will engage in private work.

B. W. Allin, an instructor in the Department of Agricultural Economics, University of Wisconsin, has accepted a temporary appointment as taxation economist with the Forest Taxation Inquiry of the United States Forest Service.

Walter H. Meyer, associate silviculturist at the Pacific Northwest Forest Experiment Station, has gone on leave of absence to reenter the Yale Forest School as a candidate for the Ph. D. degree.

Robert Marshall, assistant silviculturist at the Northern Rocky Mountain Forest Experiment Station, has gone on leave of absence to take up graduate study at Johns Hopkins University, principally in the field of plant physiology.

Harold M. Sebring, formerly district forester for the second district of North Carolina, is now district forester for the section of Florida west of Tallahassee. His successor in North Carolina is A. G. Folweiler, a forestry graduate of the Pennsylvania State College.

W. LeRoy Neubrech has been engaged by the Fc estry Department of Purdue University to study t marketing of forest products in Indiana. His fir project is a survey of the wood-using industries of t State. Mr. Neubrech received the degrees of B. S. ar M. F. at the New York State College of Forestry.

C. Svendby, a 1926 graduate of the Iowa State Cc lege, has been appointed assistant in the Departme of Forestry, State College of Washington, and will l in charge of the forest nursery operated by the sch under a Clarke-McNary agreement. The first larg scale shipment from this nursery, which occupies tract of about 20 acres adjoining the campus, will l possible this fall.

Daniel DenUyl has joined the staff of the forestr department of Purdue University. Mr. DenUyl is graduate of the Michigan State College and of Corne University, and has had experience in the United State Forest Service and in the Missouri Department c Forestry.

Charles H. England, for the past four years secretar to Governor McLean of North Carolina, has bee selected as chief game warden of that State.

Walter A. Peterson of Clarkton, N. C., has bee appointed district forester for the third forestry distric of North Carolina, with headquarters in Fayettevill He succeeds Charles H. Flory, now assistant Stat forester of North Carolina.

H. E. Clepper has been made district forester of th Weiser forest district, Pennsylvania, where he ha served two years as assistant district forester.

A. J. Grasovsky, who received the bachelor's an master's degrees in forestry from the University o California and this spring received the Ph. D. degre from Yale University, is to work under the Brit Colonial Forestry Department in the northern circ of Palestine, known as the Galilee.

L. MacIntosh Ellis, formerly chief of the New Zealand Forest Service, is now affiliated with industria forestry interests in Australia. His headquarters are in the Union Building, 8–14 Bond Street, Sydney.

Bibliography

A Good Book on Flowers

By Doris W. Hayes, United States Forest Service

"Flower Families and Ancestors," by Clements and Clements, is an unusually interesting and readable little book, well illustrated and full of appeal for any lover or student of nature.

The colored flower chart at the beginning of the book forms at once the threshold and the foundation of the text. It is simple and easily comprehended, yet it constitutes a substantial basis for a practical knowledge of flower structure and of the family relationships of flowering plants. It is simpler to use than the regular keys of the ordinary manual, and its applications are not limited to taxonomy but prove instructive and helpful also in morphology, in pollination studies, and in flower evolution.

The aim of the book—to inspire and foster in its readers the spirit of inquiry leading toward a knowledge of life processes—is well attained, although owing to the style of presentation one is likely to receive an impression of a "conscious evolution" process that can hardly be intended.

(Frederic E. Clements and Edith F. Clements: Flower Families and Ancestors. 156 pp. il. H. W. Wilson Co., New York, 1928.)

Texas Gets Out a Tree Book

The Texas Forest Service has just published an attractive 96-page pamphlet entitled "Forest Trees of Texas." It contains descriptions of 92 of the common trees of the State, with illustrations of the leaf and fruit of each and a short note on the characteristics of the wood of those species which are of commercial importance. An introduction on forestry in Texas by State Forester Siecke is included. The authors are [illegible]. R. Mattoon of the United States Forest Service and C. B. Webster, farm forester of the Texas Forest Service and Extension Service. Copies of the pamphlet may be obtained from the Texas Forest Service, College Station, Tex.

Recent Books and Pamphlets

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Fentress, C., and Coit, M.: Timbers: An analysis of timber-secured bonds as investments for individuals, bank, trust, and insurance funds. 70 pp. illus. The Mercantile Press, Chicago, 1927.

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National Lumber Manufacturers' Association: The use of lumber on the farm. rev. ed. 38 pp. illus. Washington, D. C., 1928.

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Reinhold, G.: Die papierholzversorgung. 147 pp. maps. Verlag von Carl Hofmann, Berlin, 1927.

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Stevens, H. M.: Nursery investigations. 181 pp. illus. London, 1928. (Great Britain Forestry Commission bulletin no. 11.)

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Thompson, G. W. St. Clair: The protection of woodlands by natural as opposed to artificial methods. 223 pp. illus. H. F., and G. Witherby, London, 1928.

Troup, R. S.: Silvicultural systems. 199 pp. illus. Clarendon Press, Oxford, England, 1928.

United States Department of Labor, Bureau of Labor Statistics: Park recreation areas in the United States. 95 pp. illus. maps. Washington, D. C., 1928. (Bulletin 462.)

Wagner, C.: Lehrbuch der theoretischen forsteinrichtung. 333 pp. illus. P. Parey, Berlin, 1928.

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Forstwissenschaftliches Centralblatt, September 15, 1928.—Zur betriebseinrichtung im plenterwalde, by L. Hufnagl, pp. 593–610; Forstliche versuche, by L. Fabricius, pp. 610–19.

Geographical Review, October, 1928.—The geographical relation of soil erosion to land productivity, by H. H. Bennett, pp. 579–605, illus.

Journal of Heredity, July, 1928.—Breeding pines for more rapid growth, by L. Austin, pp. 289–301, illus.

Parks and Recreation, July–August, 1928.—Wild life conservation and forest zoology, by A. G. Whitney, pp. 424–429, illus.

Phytopathology, August, 1928.—A conspectus of needle rusts on balsam firs in North America, by J. S. Boyce, pp. 705–708.

U. S. Department of Agriculture Journal of Agricultural Research, June 15, 1928.—Experiments with classes of stock suitable for forest planting in the northern Rocky mountains, by W. G. Wahlenberg, pp. 977–1000, illus.

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Announcements

Seventh International Forest Experiment Station Congress

The seventh congress of the International Union of Forest Experiment Stations is to be held in Stockholm July 22–27, 1929. The preliminary program includes the following subjects: Reorganization of the International Association of Forest Experiment Stations and the adoption of rules whereby it shall be governed; arrangement for an international bibliography of forestry; the standardization of measuring methods and the investigation of experimental plots; methods and terminology in the sphere of forestry soil science. Arrangements are being made for a trip of about one week through south and central Sweden before the opening of the congress, and a week's excursion in north Sweden after the meeting adjourns, to demonstrate forest conditions, silvicultural methods in practice, and the work of the Swedish Institute of Experimental Forestry.

Inquiries in regard to the congress should be addressed to Statens Skogsförsöksanstalt, Experimentalfältet, Sweden.

Examinations for Forest Service Positions

An examination for the grade of junior forester will be held by the Civil Service Commission in the middle of March, 1929, and one for the grade of junior range examiner two weeks later. The entrance salary for both these grades in the Forest Service is $2,000. Nonassembled examinations for various grades of the silviculturist and forest ecologist series are also to be held in the near future, for the purpose of filling vacancies in the forest experiment stations and providing registers as bases for future appointments in forest research positions as these organizations expand. An examination will also be held in the forest economi
series. Appropriation increases effective July 1, 192
will enable the Forest Service to begin the nation
survey of the timber situation for which $3,000,000
authorized by the McSweeney-McNary Act, and
begin a study of the cost and return of timber grov
ing. Salaries for different grades in the three seri
mentioned are: Assistant, $2,600–$3,100; associat
$3,200–$3,600; full grade, $3,800–$4 400; and senio
$4,600–$5,400.

Inquiries in regard to these examinations should
addressed to the Forest Service or the Civil Servic
Commission in Washington, D. C.

* * *

The Western Forestry and Conservation Associatio
will hold its annual meeting March 18–19 in Seattl
Wash. The main topic of the meeting will be Th
Problem of Full Perpetual Protection for Nonearnin
Cut-Overs and Reforesting Lands. Current protectio
forest growing, and research projects in which th
agencies represented in the association are interes
will be discussed.

* * *

Dr. E. A. Ziegler invites correspondence from fores
ers, lumbermen, and others interested in technic
forestry, in regard to a European forestry tour f
which a party plans to sail between April 10 and 1
This is the sixth annual tour managed by Docto
Ziegler with Dr. C. A. Schenck as guide and directo
It is planned to study forestry work in Holland, Switze
land, France, and Germany. A side trip will be mad
into Sweden and Finland if a sufficient number desi
it. Expenses will be about $580. The return dat
is June 9. Doctor Ziegler is to be addressed at th
Pennsylvania State Forest School, Mont Alto, Pa.

Because the free edition of this periodical is necessarily limited, it can be distributed without charge outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

Material offered for publication in the Forest Worker should be addressed to L. C. Everard, Editor, United States Forest Service, Washington, D. C.

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State Forestry

ommunity Forests Spread in New York

The community-forest idea has unmistakably car- d New York State. At the beginning of 1927, nservation Commissioner Macdonald reports, there re 217 community forests in the State; at the end of 28 there were 317. The past year saw forest proj- s initiated by 24 villages, 12 school districts, 4 unties, 3 towns, and 1 city, first-year plantings under ese projects aggregating 596,000 trees.

Ten New York State communities began their est plantings as long ago as 1909 or 1910. These the cities of Glens Falls, Gloversville, Johnstown, d Rochester, the county of Chemung, and the vil- es of Carthage, Ilion, Sherburne, Sidney, and aterville. The watershed of Carthage is now pro- ted by a forest of 843,000 trees, the largest village est in the State; the forest of Rochester, on its mlock Lake watershed, contains 1,545,000 trees; the Glens Falls watershed-protection forest, the nd largest municipal forest in the State, now has 07,000 trees.

New York City has reforested several thousand es on its Ashokan watershed. Planting on this nicipal forest, the largest in the State, was begun contract but has now made use of 2,541,000 trees sed in the State nurseries.

Forest planting by counties has been strongly urged the New York Conservation Commission as a ans of profitably utilizing abandoned farms and er idle land, of which the State contains several lion acres. Within the last few years this plan has idly gained favor. At the end of 1920 only 5 nties in the State had established forests, but the mber has now swelled to 34. Outstanding examples Otsego County, which is planting regularly each r and has now planted 1,106,000 trees; Erie unty, which has appropriated $55,000 for a 5-year gram of purchase and reforestation of idle farm ds; and Scoharie and Oswego Counties, which e planted 150,000 and 136,000 trees, respectively.

The latest movement is for the establishment of ests by school districts. An interesting example is school forest of the town of Watson, in Lewis County. Each year the Watson school children celebrate Arbor Day by planting 10,000 forest trees on a 94-acre tract of cheap land bought for this purpose in 1921. Projects such as this are encouraged not only for the sake of future revenue for school support but because of the educational benefits both to the school children and to the community.

In the 317 community forests of New York State there have been planted 20,817,500 trees of all the varieties furnished by the State nurseries. Forest trees for planting on publicly owned land are supplied by the State without charge.

Municipal Forests in Ohio

The city of Wellston, Ohio, is developing a municipal forest on lands in Jackson and Vinton Counties surrounding Lake Alma, the source of the city's water supply. The city-owned land surrounding the lake totals about 400 acres. A planting program has been worked out through the cooperation of the State forestry department and a first planting of 10,000 Norway pines and 10,000 Scotch pines was made last spring. On 300 acres of second-growth timber, principally oak, chestnut, hickory, and poplar, woodland improvement work is to be carried on under a plan outlined by the extension forester.

The city waterworks department of Akron, Ohio, has developed a transplant nursery in which more than 200,000 seedling trees are growing to a size that will enable them to compete with heavy sod. In Barberton, Ohio, the city waterworks department began planting on a large scale in 1928 and plans, along with the reforesting of idle land, to develop a wide shelter belt of pine or spruce all around the large city reservoir. Such a shelter belt prevents much débris from being carried into the water, in addition to acting as a soil binder to prevent rapid erosion of the banks. Evergreens are preferred for this purpose not only because they form an effective shelter throughout the year but because the leaves of deciduous trees accumulate around outlets and tend to stain the water.

Other Ohio cities that have established municipal forests are Cincinnati, Oberlin, Cleveland, and Akron.

California Park Bond Issue Approved

The California park bond issue was approved in the November election by a large majority. The proposition voted upon provides for a State bond issue of $6,000,000. This amount is to be expended by the State in the establishment of parks on the basis that half the expense of each project shall be met from other sources. A state-wide survey of California to provide a basis for the choice of areas for park purposes has been made under the direction of Frederick Law Olmsted.

The $25,000,000 forest bond issue proposed in Pennsylvania was defeated in the election, as was the $20,000,000 bond issue for forest, game, and fish preserves and public shooting, fishing, and recreation grounds in Illinois.

Reforestation Work in Los Angeles County

In the fiscal year 1927–28 the forestry department of Los Angeles County, Calif., collected 6,698 pounds of clean tree seed. The 908 pounds of conifer seed was principally of Coulter pine, piñon, and Jeffrey and Digger pine, and included 25 pounds of bigcone spruce. The 5,790 pounds of hardwood seed included black walnut, canyon live oak, California buckeye, California scrub oak, coast live oak, and other species. In addition the department collected 510 pounds of seed of wild cherry, manzanita, and other brush species. During the year the department planted 85,957 trees for reforestation purposes and used 4,271.5 pounds of tree seed in direct seeding. It also distributed 41,332 trees to individuals without charge for planting on major watersheds and sold 13,005 trees.

Although about 4,500 trees were removed from the highways, primarily owing to street alterations, plantings made by the department and by private individuals under department supervision resulted in a net gain during the year of about 8,000 trees along roads other than State highways and along streets in unincorporated sections of the county.

The year's fires burned over 328 acres of timberland and 24,561 acres of brush watershed in the county, as well as more than 7,300 acres of pasture land and hay and grain fields. Several of the disastrous fires of the year occurred in December and February. In Los Angeles County no month in the year can be considered to be outside the fire season, County Forester Turner tells us, and the light rainfall that has been experienced in several successive years has brought about a serious fire situation, with the lower portions of shrubs dying out and the leaf mold highly inflammable.

A new ordinance that came into force April 2, 1928, regulates the building of cabins and other structures on the brush-covered areas of the county and provides for the maintenance of firebreaks around such structures.

Some 60 miles of firebreak was cut and burned during the year, most of the work being done with a tractor, and 42.9 miles was maintained. More th 18 miles of new trail was constructed, and 49.8 miles permanent telephone line was built. An exceptiona difficult task performed during the year was the er tion of a lookout tower and cabin on the summit Mount Islip, at an elevation of 8,240 feet. All t steel and other material used in this job had to packed on muleback or by man power over a distar of 9 miles, up a grade of more than 7,000 feet.

During the year the fire-prevention bureau hibited prize-winning booths at the Norwalk, Down Baldwin Park, Puente, and Pomona Fairs and a installed booths in Altadena and Belvedere Garde In April the department purchased a motion-pict projection machine and several reels of films. The fi prevention bureau in cooperation with other divisio has supervised the production of two reels of fi showing various phases of the work of the departme Fire-prevention talks illustrated with these films ha been made by members of the bureau throughout t public schools of the county, at the county and ot fairs, and before a large number of civic organizatio

Tree Planting by New York Sportsm

Sportsmen of New York State have a new mark shoot at since the Chenango Fish , Game, and Gun Cl in 1928 planted and caused to be planted a total 1,779,500 forest trees. This record, for which t James S. Whipple reforestation cup has been award to the club, more than doubled any that had previou been set up by a sportsmen's club in New Yo Second rank for 1928 went to the Cortland Coun Sportsmen's Association for the planting of 256, trees. The Lowville Club took third place with planting of 228,000 trees, and the Genesee Coun Club made the fourth highest score of 137,000.

Conference of Massachusetts Town Forest Committees

A conference of town forest committees of Mas chusetts was held in Boston December 7, at the call Harris A. Reynolds, secretary of the Massachuse Forestry Association. Under the Massachusetts l a town forest, once established, is managed by a to forest committee of three. Mr. Reynolds's plan was get these committees together for the purpose learning what was going on in the various towns, a also for the purpose of forming the committees int central organization. The meeting had an attendar of nearly 100 people. The speakers included M Reynolds, State Forester Foster of New Hampshi and R. T. Fisher, director of the Harvard Fore Resolutions were adopted calling for a meeting in 19 at which plans for a permanent organization will taken up.

Town forests are owned by 80 towns in Mas chusetts.

Fire Losses Reduced by Minnesota Association

The Wales Forest Protective Association, organized 1922 by timber owners of the Wales district, Minneta, is reported by the Smoke Screen to patrol not ly 120,000 acres of land belonging to its members it 63,240 acres owned by the State and 516,760 es in miscellaneous ownership. The association ns 90 miles of telephone line and has six lookout wers including three steel towers built in cooperaon with the Minnesota State Forest Service. Its adquarters include a cook camp, warehouses, ice ouse, machine shop, bunkhouse, oil station, office, d houses for ranger and assistant ranger. It has ols and equipment for 200 fire fighters, including gas-motor pumps, and employs from 12 to 20 men. uring the past seven years $127,854 has been spent the association, and $10,960 by the State, to proct the 700,000-acre district from fire. The year fore the association was formed, a single fire on this strict caused a timber loss of more than $50,000; in e 7-year period since its formation, the total damage forest fire in the district is estimated to have been ,224.

Oregon Wardens and Inspectors

Under the cooperative fire-protection plan that overs a great part of the timberlands of Oregon, fire ardens are employed jointly by timberland owners' ssociations and the State. The choice of men for ese positions is made by the directors of the associaons with the approval of the State forester. Along th the major administrative work of forest protecn, the wardens are responsible for issuing a large roportion of the burning permits that are required y the State's fire code. The burden of law enforceent, however, is laid not on the wardens but on inspecors employed wholly by the State. It is the duty of hese inspectors to visit all mills, logging operations, nd other centers of fire hazard, notify the operators f any points in which they are delinquent, and follow ach case of violation until it is settled.

* * *

The Chamber of Commerce of Stokes County, N. C., as appropriated $750 for cooperation with the State orestry division and has entered into a contract for he organization of a warden service. This is the rst forest fire protection contract entered into with he North Carolina Department of Conservation and ndustry by a commercial organization.

* * *

The North Carolina Board of Conservation and Develpment has made $25,000 available for the establishment f a new game farm in the eastern part of the State.

Black Walnut Planting Advocated for Indiana

Black walnut timber sold at an average price of $108 per 1,000 board feet in the standing tree in Indiana in 1927, Acting State Forester Wilcox tells farmers of the State in advising them to plant this species. "One type of land that is especially adapted to the planting of black walnut," says Mr. Wilcox, "is the lowlands adjoining streams that are occasionally overflowed. The overflowing of the land for short periods does not injure the black walnut. Some of the best soils of the State are on the flood plains adjoining the streams. On flood plains where the soil is extremely rich and is well drained but at the same time has plenty of miosture, the black walnut makes rapid growth and should produce fair-sized saw logs in 35 years' time." The walnut will grow well, he adds, not only on the lowlands but on moist slopes or almost any land of fair fertility. It should not be planted on sour clay soils that have become eroded or have been "farmed out." It is well to set out the walnut trees in mixture with pine, spruce, or sugar maple so that they are spaced approximately 8 feet apart. The spruce can be marketed at a good profit in from 10 to 15 years for Christmas trees.

Alabama Fire Cooperation Takes in New Territory

The cooperative forest-protection system of Alabama now covers more than 14,825,000 acres, the State commission of forestry announces. Three new districts established last fall added 1,090,320 acres to the total protected area. One of these includes the extreme southern portion of Chilton County and all of Autauga County except a strip along the southern and eastern boundaries; one comprises the whole of Dallas County; and the third includes about 138,000 acres in the south central part of Wilcox County and the north central part of Monroe County. Districts previously established have recently been enlarged by the addition of about 355,170 acres of land in Calhoun, Clay, Cleburne, Randolph, and Tuscaloosa Counties.

The men appointed as forestry agents of the three new districts are, respectively, W. O. Durbin, Vida, Ala.; Frank Averyt, Orrville, Ala.; and O. J. Black, Natchez, Ala.

* * *

A new steel lookout tower and watchman's cabin have been erected by the New Hampshire Forestry Department on the summit of Rock Rimmon in the town of Kingston. This is intended to cover a group of towns in south central Rockingham County. Another steel tower and cabin were recently completed on Oak Hill in the town of Loudon, near the Concord line. This tower is approximately in the center of a 40-mile stretch between other stations.

Georgia Landowners Build Fire Breaks

Georgia landowners last fall demonstrated unusual interest in firebreak construction, Assistant State Forester Merrill reports, especially in the country north of the Altamaha River. This special effort to prevent fire is being made with the idea of saving the large crop of seedlings expected from last year's heavy seed crop of both longleaf and slash pine. The usual procedure in building the firebreaks is to plow a furrow or two about 20 feet inside the road and parallel with it, then burn the strip between road and furrow.

◆

A new forest nursery site of about 95 acres has been acquired by the New York Conservation Department in the village of Horseheads, Chemung County. The department plans to get the soil in shape so that seed beds and transplant beds may be used this spring.

Six units of land totaling 600,000 acres have be placed under organized fire control by the Flori Forest Service since April, 1928. The owners of mc than 400,000 acres of land in addition to this ha applied for cooperation from the State in fire protectic State Forester Baker will undertake protection on adc tional areas as soon as well-rounded units can shaped up.

◆

About 43 miles of forest-fire safety strip was built the spring of 1928 by railroads in the Forbes forest di trict of Pennsylvania, which comprises Alleghen Fayette, Greene, Somerset, Washington, and Wes moreland Counties. (Allegheny County includes tl city of Pittsburgh.) This is 17 per cent of the tot mileage of railroad safety strip needed in the distric Assistant District Forester Kurtz reports. The co averaged $68 a mile.

Education and Extension

Yale's Tropical-Wood Collection

Yale University's tropical-wood collection now contains 14,000 specimens, representing nearly 1,400 different genera of 160 natural families. The wood samples, pressed and dried leaves, flowers, and fruits, and accompanying notes on the size and abundance of the trees and the local uses of the timber have been contributed in the main by volunteer cooperators living in the Tropics. Professor Record, who has charge of the university's department of tropical forestry, says:

> All sorts of people in out-of-the-way places are delighted at this opportunity for contact with the outside world and willingly devote their leisure time to such work with no thought of reward other than recognition and appreciation. There is an unwritten rule that the first new species discovered by any collector is named in his honor. During the past three years about 125 new species have been discovered by Yale's unofficial staff. This volunteer corps is but the nucleus of a regiment it is hoped to enlist. Some of the largest commercial organizations operating in the Tropics encourage their employees to undertake such work.

On every field trip Professor Record and his field assistant, G. Proctor Cooper, endeavor to find and train local collectors and observers. Since the tropical work must be correlated with that of the temperate regions, the tropical forestry department has collectors and correspondents in almost every forest region of the world.

Through cooperation with the United Fruit Co. the forests of Guatemala, Honduras, and Panama are being carefully explored at very small cost to the university. A civil engineer has for the past year been sending in the first detailed accounts ever obtained of the fores of eastern Nicaragua. The foresters of Porto Ric Haiti, and British Guiana are cooperating with Yal Specimens from Cuba are contributed by a number correspondents and collectors of whom the most acti are a nurseryman and a priest.

The newest cooperative project is a study of tl West African forests on the concession of the Firesto Plantations Co., in Liberia.

School Forest Presented to Oregon Stat

Twenty-four hundred acres of cut-over forest la in Columbia County, Oreg., has been given to tl Oregon State Agricultural College and is to be use by its school of forestry for research in reforestatio The land is situated just south of Kerry and west Clatskanie. The donor is John W. Blodgett, timb owner of Michigan and Oregon.

A new addition to the forestry equipment of th college is a research dry kiln, standard size as to cro section and taking stuff up to 22 feet in length. Tl kiln is fully equipped with automatic recording device It will be used not only in research but in demonstra ing dry-kiln methods to mill men.

The college entered on the present school year wi a record enrollment of 186 forestry students.

◆

A record-breaking registration is reported this ye by the New York State College of Forestry, with 14 students admitted as freshmen and 11 students i advanced standing accepted by transfer from oth institutions. The college quota was filled by Augu 27, and admission was refused to 35 applicants.

armer Makes a Profit from Thinning His Woodland

By **R. W. Graeber**, Extension Forester of North Carolina

Last winter G. M. Hatley, a farmer of the Hudson mmunity in Caldwell County, N. C., decided to find ut for himself whether the operation of thinning a ody of farm timber would pay its own expenses, in dition to bringing about a better spacing of the trees t standing.

Mr. Hatley says: "During the winter months I have lot of idle time that I would like to put to use at a asonable wage. I decided that if by thinning my mber I could make $2 a day for my own labor and art of the time an additional $1 a day for my team, it ould be better than being idle or going rabbit hunting."

With the help of County Agent P. M. Hendricks, Ir. Hatley selected for his demonstration area an acre second-growth shortleaf pine about 28 years old. he pines had reclaimed an abandoned field previously lowed to erode badly. They had stopped all gullies nd had made fairly good growth.

Mr. Hatley's cutting left on his acre a full stand of 20 of the thriftiest, straightest, and most vigorous ees, so spaced as to make rapid growth. He cut the inning into poles, at a rate of three or more cords a ay, crediting himself with 75 cents a cord for this work. t 50 cents a cord for hauling the wood to an open field found he could make wages for himself and his team. e was obliged to hire someone else to saw the poles to blocks, at $1 a cord. The cost of splitting was $1 cord. Hauling to market at $2 a cord gave wages for mself and for his team. This made a total labor cost $5.25 a cord, and the wood sold at $7.50 a cord. The of 8 cords gave a net return of $18 an acre for the mpage, enough to pay taxes and interest on an re of cheap land for several years, and a net labor turn to Mr. Hatley of $34.

These returns have persuaded Mr. Hatley in the ture to cut all his wood supply on this basis and to arket wood as a means of obtaining income from rm labor during the winter months.

The acre of pine timber thinned last year will require nother thinning in from five to eight years; thus a eriodical harvest from the land is provided for.

Mr. Hatley set a good example in marketing his ood as a finished product. The day is rapidly passing hen farmers can sell wood in 4 to 8 foot lengths. The arket demands a finished product ready for the stove.

◆

A maple products display was shown at county fairs t Oakland and Hagerstown, Md., last fall, illustrating d and new methods of handling the maple-sugar op. Interest was attracted by means of a realistic presentation of a flow of sap from tree trunks exibited, which was arranged by concealing tanks of veetened water inside the trunks.

Forestry News for High Schools

High-school papers of Washington and Oregon have a special correspondent in the Portland, Oreg., office of the United States Forest Service. For the fifth year John D. Guthrie, assistant district forester at Portland, is supplying the high schools of the two States with press material on forestry specially prepared for their use. Every other week throughout the school year Mr. Guthrie sends the schools a brief release. Together with incidents in the life and work of forest rangers and forest-fire stories, he introduces fundamental facts about forest problems. Many of the schools use the material in English, economics, or civics classes and also on bulletin boards. The school editors are invited to make suggestions as to the choice and presentation of material.

Ohio Four–H Forestry Clubs

In the second year since the beginning of Four–H forestry club work in Ohio, boy and girl members of the clubs have planted 103,500 forest-tree seedlings on their home farms. The seedlings, which were principally pine, came from the State forest nursery. Four–H forestry clubs are now organized in seven counties of the State and have a membership of 126. Each first-year member is required to plant forest trees on 1 acre of his home farm. Other work of the clubs includes studies in tree identification and in farm woodland management.

Mississippi Holds Essay Contest

Mississippi school children in the grades from sixth to twelfth, inclusive, are invited by the State forestry commission to compete in writing essays on Why Mississippi Should Practice Forestry. Essays must not exceed 1,000 words. The contest opened on Arbor Day, December 14, 1928, and will close on April 1, 1929. In each of three divisions of the State there will be awarded three prizes of $25, $15, and $10, respectively.

Mississippi Maps Show Forest Land Areas

Five maps prepared and distributed by the Mississippi Forest Service show acreage and location of remaining timberlands of the State; forest land—that is, land classified in the 1926 report of the State tax commission as timbered or "uncultivable"—by counties; the proportion of forest land that is in farm woodlands, by counties; estimates of the value to be derived annually from timberland if it is protected from fire and managed on a sustained yield basis; and the proportion of farm area that is in woodlands, by counties.

Changes in the Michigan Curriculum

Changes put into effect at the beginning of the present academic year by the school of forestry and conservation of the University of Michigan in courses leading to the bachelor's and master's degrees, Dean Dana writes, establish a minimum requirement of one semester's work in each of the 12 subjects dendrology, silvics, silviculture, mensuration, fire prevention and control, forest entomology, forest zoology, forest pathology, logging and milling, structure and properties of wood, forest regulation, and either forest economics or forest policy. Fifteen hours of the student's schedule in the 2-year course leading to the degree of bachelor of science in forestry are left open for continuation courses in any of these subjects or for advanced work in the basic sciences or in subjects clas fied as cultural. The third year of the course leadi to the degree of master of science in forestry, which regarded by the school as its standard course, elective throughout, the choice of subjects bei restricted only by the requirement of approval by t dean of the school.

During 1929 the university hopes to replace t present surveying camp for foresters with a summ forestry camp in the Upper Peninsula of Michiga at which field instruction will be given in forest me suration, fire prevention and control, and fore improvements. When this summer schedule go into effect, the requirements in these subjects at A Arbor will be reduced, leaving greater opportuni for election of courses in forestry and allied subject

Forest Service Notes

Lake States National Forest District Created

A new national forest district has been created, embracing the States of Minnesota, Wisconsin, and Michigan. These States were formerly included in the Rocky Mountain National Forest District, which has its headquarters at Denver, Colo.

The new district, to be known as the Lake States District, contains four national forests having a total area of nearly 1,200,000 acres of Government land. In recognition of the acute need for reforesting large areas in this region that are adapted for timber production but are now idle, the National Forest Reservation Commission has approved a program contemplating the acquisition for national forest purposes of 2,500,000 additional acres of land in the three States. This proposed extension of Government ownership of forest lands, and the possibilities for development of forest resources represented by the vast acreage of privately owned forest lands in the Lake States, have made it desirable that the region be covered by a separate administrative organization of the Forest Service.

Earl W. Tinker has been made district forester of the new district. As assistant district forester of the Rocky Mountain National Forest District Mr. Tinker has for several years supervised the land exchange and acquisition work of the Forest Service in the Lake States. He is a native of Michigan and a graduate of the Michigan State College of Forestry. Following a year of graduate work in the Yale Forest School he was employed in forestry work by the Canadian Pacific Railway. He has been a member of the United States Forest Service since 1915, serving within that period as supervisor of the Arapaho and Bighorn National Forests and as assistant chief of fore management in the Denver office.

District headquarters are being established ter porarily at Madison, Wis.

Caustic Soda Treatment Improves Glue Joints

Certain species of wood that frequently produ weak or inferior joints when glued into doors, furn ture, airplane propellers, and similar articles have bee found by the Forest Products Laboratory to produ stronger joints if treated with caustic soda. The woo experimented with were sugar maple, yellow birc white oak, red oak, red gum, black cherry, bassw and osage orange. A 10 per cent solution of caus soda gave the best results, although the strength joints was improved by the use of weaker solution The wood surfaces to be joined were brushed with th solution, after 10 minutes were wiped with a cloth, an were then allowed to dry before being glued. Afte 10 days' conditioning the glued blocks were give machine tests for strength.

The effect of the caustic-soda treatment in improvin the strength of glued joints was especially pronounce in certain woods in which "starved joints" are ordi narily produced. ("Starved joints" are those in whic the film of glue between the wood surfaces is no continuous.) This is well illustrated by the result obtained in tests of sugar maple glued with anima glue. The shearing strength of a piece of untreate wood glued under favorable conditions was 3,11 pounds, as compared with 1,570 pounds for an untreated piece with starved joints, and 3,250 pounds fo a piece treated with caustic-soda solution but glue under the same starved-joint conditions.

To Burn or Not to Burn for Lodgepole Regeneration

In a typical lodgepole-pine stand on the Medicine ow National Forest, at the southern boundary of yoming, a study of natural reproduction after utting showed that much larger numbers of seedlings ame in on areas where the slash had been piled and rned. The investigators, Silviculturist Carlos G. ates and Forest Supervisor Huber C. Hilton, have ot been moved by these results to advocate the eneral practice of slash burning on such areas. Inead they advocate the method of slash disposal that as followed by less abundant reproduction, on the asis that in this case enough is greatly preferable to ore than enough. The reproduction established here the slash had not been burned was fully suffient to develop stands of the complete density that aracterizes lodgepole pine and that gives rise to the ender, lightly limbed stems for which the species is oted. The additional numbers of seedlings produced here slash was piled and burned, instead of serving ny useful purpose are a detriment to the development f the stand. Superabundance of the seedlings retards eir growth while they are yet small, sometimes ringing the youthful stand into a state of stagnation. n the usual Medicine Bow site and on many others e problem with lodgepole pine is not how to obtain dequate reproduction but how to restrict reproducon so that the young stands can develop to commeral sizes at a satisfactory rate without artificial inning.

The area on which this study was made is a flat of etter than average site quality, where both soil and matic conditions conduce to heavy reproduction. plots that were clear cut a count of seedlings 10 ears after cutting showed 13,231 seedlings per acre here the slash had been piled and burned and 4,120 per cre where the slash had been scattered and left to ecay on the ground. On plots where groups of trees onstituting from 30 to 35 per cent of the volume of he stand had been cut, leaving openings from 20 to 0 feet in diameter, the seedlings numbered 62,509 per cre where the slash had been piled and burned and 1,956 per acre elsewhere. On plots where the volume f timber had been reduced in the same proportion y a selective cutting that thinned the stand as evenly s possible, the comparative numbers of seedlings ere 72,558 and 25,424.

The early influence of slash left on the ground in re-arding lodgepole pine reproduction is attributed partly o the fact that this method of slash disposal leaves he humus layer in a comparatively undisturbed con-ition and results in its being increased. This tends to eep seed from reaching the more even moisture of ineral soil. The second factor by which this influence s explained is the effect of shade in preventing germina-ion; previous experimentation showed that lodge-ole seed germinate promptly and fully only when subjected to considerable daily fluctuations of temperature. Evidence that the leaving of slash results in more vigorous growth of reproduction after the first few years and that it conduces to gradual seeding, which involves less danger of overstocking and stagnation than does the appearance of vast numbers of seedlings at the same time, was brought out by tallies made on the clear-cut plots 10 and 15 years, respectively, after cutting. On the plot where the slash had been scattered and left many of the seedlings were taller and were growing faster than the best of those on the plot where the slash had been piled and burned; and between the dates of these two tallies the number of seedlings increased on the former plot, while decreasing on the latter.

On clear-cut areas an undesirably numerous crop of seedlings may come in even if slash is left on the ground, if the tree tops left are especially heavy with cones. In this event it is recommended that the tree tops most heavily laden with cones be selected out of the slash and burned. Since individual trees vary greatly in their retention of cones, the selection of such tops is a simple matter. The conclusions from the Medicine Bow study would limit the use of fire in lodgepole stands to the burning of such tree tops and the burning of coarse, unmerchantable material, branches, etc., in spots or lanes where this material would otherwise constitute a special fire risk.

In this study spots of ground where the humus had been destroyed by fire were observed three years after the burning to have relatively few seedlings growing in their centers, but many around their edges where cones, as well as coarser material of the slash piles, had escaped burning. Later some seedlings started in the centers of these spots and developed rapidly.

On clear-cut plots very even distribution of seedlings was obtained, the earlier seedlings advanced rapidly in size, and 10 years after the cutting moderate numbers of new seedlings were observed to be coming in.

On uncut plots adjoining those on which the experimental cuttings were made more than 26,000 seedlings per acre were found. Those making appreciable growth were sufficiently numerous to guarantee the future of the forest if all escaped damage during the eventual cutting of the mature timber, but their distribution was very irregular.

A study similar to that on the Medicine Bow Forest was carried out by Mr. Bates and Forest Supervisor Theodore Krueger on the Gunnison National Forest, a little southwest of the center of Colorado. The area studied was a steep northwestern slope, and was less productive than that studied on the Medicine Bow. Reproduction was studied on uncut plots, clear-cut plots, and plots on which heavy and fairly heavy cuttings were made. Practically no reproduction was found on uncut areas except along edges adjacent to open areas. On both thinned and clear-cut plots an examination 12 years after cutting disclosed adequate reproduction, the average number of seedlings per acre for the four plots ranging from 2,225 to 6,049. On one clear-cut plot an overabundance of reproduction was found on an area where the soil had been considerably disturbed by the moving over it of timber cut on adjoining higher ground. On the Gunnison area there appeared no such crops of underdeveloped and probably short-lived seedlings as composed a part of the very heavy reproduction on the more fertile Medicine Bow area.

The observation that typically dense stands of lodgepole pine reproduction have usually come in after fires that almost or completely destroyed the parent trees has in earlier years led foresters to question whether burning might not be necessary to obtain adequate reproduction of this species after cutting. The lodgepole pine has a faculty of retaining its seed year after year in tightly closed cones clinging to the branches. Earlier studies by Mr. Bates indicated that such cones may comprise the equivalent of three normal yearly seed crops. The opening of these cones by the heat of the fire, and the clearing away by the fire of vegetation that would have competed with the pine seedlings, largely explain the profuse reproduction following fires. The studies here reported indicate that, quite independently of fire, lodgepole pine reproduction is easily obtained on medium-to-good sites wherever sufficient cutting is done to make room for it. A very light thinning induces the partial establishment of great numbers of seedlings, of which sufficient numbers are likely to be on hand for many years after such a thinning so that, following a second cut, a new stand would quickly develop. Under partly cut stands reproduction may develop well in spots but is likely to be as patchy as is the stand that is left. This unevenness is further accentuated by the burning of slash in piles, which tends to remove all root competition from the immediate area, including that of the trees left. It is believed by the investigators that adequate reproduction can be obtained on clear-cut areas of any extent unless the cones in the tops of trees cut are largely destroyed by burning.

Tree to Tree Spread of Western Yellow Pine Blister Rust

The western yellow pine blister rust (*Peridermium Harknessii*) can spread directly from tree to tree, according to the results of an experiment in the Halsey plantation on the Nebraska National Forest. When a search by pathologists had failed to disclose alternate hosts for the rust in this plantation, where the disease broke out several years ago, a shelter of muslin 4 feet square was placed around some 1-year seedlings of western yellow pine and some of the fruiting bodies of the rust were scattered over these seedlings. The seedlings were transplanted at the end of their second year and were held in the transplant beds for one year. Last spring four of the 3-year-old transplants were found to have well-defined peridermium galls apparently about ready to fruit.

Ips and the Sun Cure

Sun curing of western yellow pine trees felled on Prescott National Forest, Ariz., in 1928 did not p effective in ridding the trees of broods of the engra beetle (*Ips*), although similar treatment has been with success as a method of controlling the west pine beetle (*Dendroctonus brevicomis*) and the moun pine beetle (*Dendroctonus monticolae*) in parts of fornia and on the Crater National Forest, Oreg.

The experiment was conducted by Ranger John McNelty. Blackjacks 60 to 80 years old and 14 16 inches in diameter at breast height were felled the vicinity of Groom Creek, the fellings beginning latter part of March and ending the first part of Ju Because Ips are especially attracted to the bark freshly felled trees, it was possible to experiment w trees that when felled had not yet been attacked the insects, and thus to watch the attack from very beginning.

The logs were so placed that with few excepti they were exposed to sunlight from about 9 a. m. between 3 and 5 p. m.

The attack on the first tree felled was slow and c ered a period of three weeks. In other cases the t was attacked within one week on the half next ground and within two weeks on the half more expos to the sun. One log that had a diameter range of fr 8 to 16 inches and that was exposed to sunlight fr noon until 2 p. m. was attacked completely in th days, and all of the brood matured. The logs t were exposed to the sun for longer daily periods w attacked on the upper half only after the shaded p had been filled, sometimes as late as two weeks af the first attack. Some of the logs less than 6 inch diameter were never attacked on the upper porti

The size of broods varied with the size of the log a the thickness of the bark. On a log not more than inches in diameter and having bark about one-four inch thick, the insects were killed in the larva sta over a space about 4 inches wide on the upper sid On logs less than 10 inches in diameter having ba about one-fourth inch thick, 50 per cent of the insec were killed over a space 3 to 4 inches wide on the upp side. On logs 10 inches or more in diameter havi bark more than one-fourth inch thick, no death lo occurred in the brood.

The temperature of the logs, taken at irregular inte vals, was found not to vary greatly during war weather. The highest temperature recorded for an i dividual log was 118° F., and the highest average ten perature recorded for the logs in any day was abo 112° F. When the highest log temperature was regi tered the ground alongside of the log had a temper ture of 140° F. On warm days the ground temper ture was usually from 108° to 114° F. The dail maxima for air temperature were from 80° to 90° F.

According to the results of this experiment the max mum kill from sun curing that could have been o tained by turning the logs is 50 per cent on mater ess than 8 inches in diameter and 20 to 30 per cent on ogs between 8 and 10 inches in diameter.

Logs up to 24 inches in diameter from which one-ourth of the bark surface was removed, in four strips, nd which were exposed to sunlight did not produce nore than one-third of the brood of Ips ordinarily ound on untreated logs of that size.

Although this experiment indicates that solar heat ill not destroy broods of Ips unless it reaches higher emperatures than those ordinarily recorded in the icinity where the test was made, it was observed that ps did not attack the upper portions of logs so readily vhen these were exposed to the sun and that they nade a heavy attack on logs so exposed only when ther material was not available. Where Ips are prev-lent, Ranger McNelty concludes, it would seem that imbs and logs from 4 to 8 inches in diameter may vell be placed where the sunlight will strike them and hat trees more than 8 or 10 inches in diameter may vell be scalped on four sides if they are to stay on the ground. When the majority of the Ips are in either he larval or the pupal stage it is worth while to peel he attacked log, leaving the bark in the sun with the nner side up. This treatment will kill the larvæ and pupæ, but will not affect the mature insects.

Sample Plot Check on Timber Sale Marking

By Quincy Randles, United States Forest Service

National forest officers in charge of project timber sales in the Southwestern National Forest District are required to establish at least one 10-acre sample mark-ing plot each 60 days. The timber on the plot is arked and calipered and the volume of timber marked and left is computed by species. This method of sampling the marking has been found of considerable value in checking the percentage of timber removed against the percentage guaranteed by the sale agreement, in determining how closely the standard marking rules as to number and size of seed trees, etc., have been complied with, and in training men to mark timber correctly. Under this method it is possible for the marker to check up on the amount and kinds of timber left per acre.

A special 3-sheet form has been prepared for recording the work done on these plots. The first two sheets provide for a record, by diameter and height, of the trees marked and left; the third provides for a summary, by species, of the number of trees and volume marked and left per acre, also for notes on defect, insects, mistletoe, reproduction, and other factors that influence the marking. A study of the summary sheet for a marking plot enables the reviewing officer to get a good picture of conditions on the plot and the character of the marking.

Application of Second-Growth Douglas-Fir Yield Tables

Having completed the preparation of yield tables for normal fully stocked stands of second-growth Douglas fir, the Pacific Northwest Forest Experiment Station is now endeavoring to work out a method of applying these tables to average stands, which are ordinarily somewhat understocked. On the basis of two field seasons' work on the problem Walter H. Meyer of the station staff has concluded that, by and large, second-growth stands of Douglas fir over large areas have approximately 80 per cent of the volumes given in the tables for normal fully stocked stands. This estimate assumes the exclusion of nonforested areas, or major openings, that are large enough to be type mapped in the survey. According to Mr. Meyer's observation sampling by strips, if the strip width is properly controlled, is more reliable than sampling by plots. The most reliable index of stocking is basal area; total number of trees is a very unsatisfactory index. The largest stand volumes are found on slopes of approximately 40 per cent. South and west aspects are apt to be variable in site quality; north and east aspects are, in general, the most favorable for growth.

Small holes in the canopy represent 10 per cent of the total area of the average second-growth Douglas fir forest according to the estimate of Mr. Meyer, who found that the most important cause of these holes is the presence of gullies, creeks, and small patches of hardwoods. Fire, he found, although it had gone through half the areas studied and had undoubtedly been a factor in thinning the stands when they were young, was not prominent as a cause of small holes in the canopy of forests of pole size and larger.

A digest of the principal yield tables for second-growth Douglas fir was published in the West Coast Lumberman of May 1, 1928.

Knotty Boards for Boxes

A box with short, thick sides is more resistant to rough handling [if it is made of knotty lumber than if it is made of clear lumber, the Forest Products Laboratory has found. This finding applies to all boxes made of boards the thickness of which is more than one-sixtieth of their length, and to knotty boards in which no length equal to the width of a board includes knots having diameters aggregating more than one-third of the board's width. In boxes with short, thick sides, unless the shocks caused by rough handling are absorbed by the springing of the boards, failures are apt to occur as a result of a direct pull exerted by the contents of the boxes on the nails. Knotty boards absorb such shocks better than clear boards because they are more flexible.

A Fall Fruiting Elm

By E. H. Frothingham, United States Forest Service

The elms that bloom in the spring have nothing to do with the case. Ulmus serotina, for which the standard common name is red elm, in the southern Appalachians goes by the name of "September elm" because that is the month when it begins blooming. This little-known species is a tree of considerable beauty and should be popular for street planting. Its range is imperfectly known. George B. Sudworth in the 1927 edition of his Check List of the Forest Trees of the United States stated that the tree was known at different stations "only from southern Kentucky and Tennessee to northeastern Georgia, northern Alabama, northwestern and southwestern Arkansas and eastern Oklahoma, southern Illinois (Richland County)." Bailey says that it has proved hardy at the Arnold Arboretum.

Toward the end of December, 1927, R. F. Maddox, State forester of Tennessee, called my attention to "September elms" growing on his lawn at Nashville. At that late date seeds were still hanging on the trees. I took some of these to Asheville, N. C., where seedlings grown from them during the past summer attained a height of from 12 to 20 inches. Recently Mr. Maddox has supplied the Appalachian Forest Experiment Station with seed from the 1928 crop, which, he says, was an excellent one. Last fall his trees began blooming about September 10, and some were still in bloom on November 5, although at that date ripe seed had been falling from others for several days.

Mr. Maddox says of this tree that it "splits almost like chestnut. Furthermore it is one of the hardiest elms that grow; it can be found on shallow limestone soil right alongside the hackberry." In its free-splitting characteristic it resembles rock elm. As on the rock elm and winged elm, the branchlets are often fringed with thick corky wings.

A Douglas Fir Refuses to Die

A Douglas fir tree on the Olympic National Forest, Wash., that was wind thrown last winter and within a few days was bucked because it lay across a trail, four months later was bearing green, live needles and well-developed cones in which the seed were nearly mature. After it was sawed the tree had no root connection whatever with the ground. It was exposed to full sunlight. The tree's unusual growth was discovered by R. D. Maclay, technical assistant on the Olympic, in June. Tight winter buds appeared on the branches that had broken from the tree when it was thrown, showing that the growth of needles and cones on the branches still attached to it had occurred since that time. On July 12, the day before the tree was destroyed by a fire, Mr. Maclay found the needles soft and pliable and the cones growing in good shape.

Effect of Seed-Bed Density on Surviv of Transplants

The Bessey forest nursery, at Halsey, Nebr., whi produces stock for field planting on the Nebras National Forest, has announced the results of experiment undertaken in 1921 to determine at wh density seedlings should be grown for this purpo In each of the years 1921, 1922, and 1923, four lot seed were sown in seed beds in such a way as to prod respectively, stands of 75, 100, 125, and 150 seedlin per square foot. After two years in the seed bed a one in transplant beds, the trees were planted out alternate rows. At the end of the second year in t field survival counts were made and final costs of ea lot were computed on the basis of the surviving tre For western yellow pine the results show definite that it is advisable to give seedlings plenty of roo for development in the seed beds. This indicati was less well marked for jack pine. The records f the two species were as follows:

WESTERN YELLOW PINE

Year of sowing	Density 75 per square foot		Density 100 per square foot		Density 125 per square foot		Density 1 per squar foot	
	Field survival (per cent)	Final cost per 1,000	Field survival (per cent)	Final cost per 1,000	Field survival (per cent)	Final cost per 1,000	Field survival (per cent)	Fi cos pe 1,0
1921	80.0	$4.04	77.0	$4.36	72.4	$4.37	76.8	$4.
1922	71.0	4.66	64.0	5.30	46.6	7.28	55.0	6.
1923	74.4	4.70	60.4	5.55	67.2	4.93	51.0	6.
Average	75.1	4.47	67.1	5.07	62.1	5.52	60.9	5.

JACK PINE

1921	54.1	$5.90	59.2	$5.18	55.0	$5.53	59.0	$4.
1922	54.8	5.81	46.8	6.61	47.4	6.36	-----	-----
1923	77.5	4.39	59.2	5.82	74.0	4.50	49.7	6.
Average	62.1	5.37	55.1	5.87	58.8	5.46	54.3	5.

Cost of Lassen Tree Seed Low

The tree seed collected last fall on the Lasse National Forest, Calif., for nursery sowing there in th coming spring cost the Government less than 81 cent a pound. The whole operation of collecting, haulin spreading, shaking, and cleaning the 605.5 pounds seed, described by E. E. Carter in the Forest Worke of November, was carried out at an expense of $489.6 or 80.9 cents per pound of clean seed. This amoun covered not only reconnaissance, labor, and haulin but mess, rent, and depreciation on equipment.

One pound of seed of incense cedar, from cone collected by climbing the growing trees, cost $6.61; th 19.5 pounds of seed of sugar pine, collected from felle timber, cost $1 a pound; 10 pounds of white-fir seed ı cones collected from felled trees, cost 95 cents ›und.

'estern yellow pine seed, of which the whole 202 ıds came from felled timber, cost $1.05 a pound. ee cone pickers followed directly after the timber rs. At first pruning shears were used to cut off the ›s, but the shears gummed so that they were dis- ed in favor of a method something like that of ing corn. While the left hand grasped the cone its base the right hand was used to snap the cone over the left wrist. This freed the cone easily was much faster than cutting with shears. The e motion that snapped the cone off put it into the On this job, which included filling and tying sacks and carrying them to the truck, the carrying ınce averaging about 600 feet, a day's work aged about 8 sacks.

he cost of the 373 pounds of Jeffrey-pine seed was down to 65 cents a pound, partly through the ribution of a day's labor by the wife of a forest er. With one day's work of three forest officers, wife of one, and two laborers, 45 sacks of Jeffrey- cones were collected from felled timber and hauled miles to a truck. In one day 16 sacks of Jeffrey- cones were collected from young trees growing in vicinity of the Coppervale ranger station, two men bing the trees and throwing the cones to the ground one man and an 8-year-old boy sacking them.

fter the seed had been extracted by sun-drying, in r to remove the wings they were tied in a gunny , 20 pounds at a time, and the sack was beaten a flail. This worked very well. The seed were ı run through a fanning mill, which blew out all the f and dirt and most of the sticks, needles, and s

›reme Court Decree Permits Reduction of Kaibab Deer Herd

he Supreme Court has affirmed the United States ict court decree enjoining the Governor and other e officials of Arizona from interfering with the ıg of deer by Government hunters on the Grand yon Game Preserve where such killing is needed to ect forest lands included in the Kaibab National est. The decree of the lower court was modified to ide that carcasses should be plainly marked in such ıner as to show that the deer were killed within the ts of the preserve under authority of the Secretary griculture. This decision clears the way for carry- out the Government's proposal to effect temporary f of the overstocked condition of the preserve by oving a limited number of deer. The carcasses of deer killed by Government hunters under this ıority are to be used in county, State, and Federal itutions.

Through 22 years' protection the deer herd of the Grand Canyon Game Preserve has increased far beyond the number that the available forage supply will support. The surplus deer can not migrate to other feeding grounds, because they are hemmed in on the south and east by the Grand Canyon and on the west and north by a wide belt of semidesert country. The results have been injury to forage cover and to tree and shrub growth, and starvation of many deer. Hunters living in Arizona can not reach the area except with great difficulty, and hunters are not attracted to it from other States because the nonresident license is expensive and permits the killing of one deer only. The Forest Service, being responsible for the administration of the timber, forage, and wild-life resources of the Kaibab National Forest, in which the game preserve of about 1,000,000 acres is largely included, has planned to have the herd reduced by Government hunters.

New Purchase Areas in the Lake States and Vermont Approved

The National Forest Reservation Commission on December 12 approved 171 purchases, aggregating 111,230 acres of land, at an average price of $2.67 an acre. The commission approved the purchase of some 48,000 acres in the newly created Mackinac purchase unit, in Michigan, and of about 6,000 acres in the Marquette area, also in Michigan.

Six new purchase units were approved—the La Croix, containing more than 183,000 acres in the extreme eastern part of Minnesota; the Oneida, the Flambeau, and the Moquah in Wisconsin, totaling about 428,000 acres; the Keeweenaw in the Upper Peninsula of Michigan, 163,680 acres; and the Green Mountain of 100,000 acres in southern Vermont, on the watershed of the Hudson and Connecticut Rivers. The Ochlocknee and Osceola areas, in the extreme northern part of Florida, were also presented for consideration; but before approving any more purchase areas the commission decided to make a survey of its entire program to determine the financial obligation entailed.

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Study of a fire that occurred last spring has convinced J. A. Mitchell, silviculturist of the Lake States Forest Experiment Station, that fires in the hardwood country of the Lake States will bear watching for a week or more after they appear to be safe if relative humidity at 8 a. m. goes as low as 50 per cent. This particular fire, which occurred near Goodman, Wis., lasted eight days after it was first brought under control and was well trenched. It made a run on days when the humidity at 8 a. m. was 50 per cent or less, remaining dormant in the intervals.

Supervisor Sam Stoddard Sprays and Saves

The Targhee National Forest, in Idaho, had some bug-infested lodgepole pine on its hands last spring, and but little money with which to do anything about it. The trees were mostly small, and lodgepole has thin bark. On the near-by Bitterroot and Beaverhead Forests a trial had previously been made of spraying the tree trunks with kerosene and burning them standing, and Supervisor Stoddard adopted this method as a way out of his difficulty. The treatment was given to 2,568 trees having an estimated volume of 276,400 board feet. It worked. The destructive Dendroctonus were destroyed. The cost was $0.56 per tree, compared with $1.84 per tree for the few that were felled and burned and with $1.63 per tree for the felling and burning on the Beaverhead last spring.

Spraying the standing trees with kerosene and burning them proved to be 90 per cent effective. Most of the bugs that escaped from treated trees came from the portions of the trunks above the reach of the spray thrown by the small pumps used and the rest from the thick-barked lower stems where the heat was insufficient to penetrate to the wood and thu cook or damage the larvæ. In any future job of th kind a more powerful pump and a fine-stream nozzl rather than a spray should be used. Further, aft the tree trunk has been wet all over with the kerosen and the match struck and thrown at its base the flam should be intensified with a stream of kerosene fro the pump, around the base where the bark is thick an at the top where increased heat is needed for the porti of the tree beyond direct reach of the pump.

The work was done during the brief period whe the snow had melted around the trunks of the tree but not between them and during times of calm or light winds. The kerosene was hauled by team t control locations in 50-gallon drums on a "lizard" sled made from two crooked saplings for runner with bolted crosspieces. About 1½ gallons of kerc sene was used for each tree, but Supervisor Stoc dard says that if he had the job to do over he woul increase this allowance by about 1 gallon.

The entomologists point out that the almost inev table scorching of the crowns of near-by trees ma attract beetles from a distance, and have asked tha a close watch be kept to determine whether th happens on the Targhee.

General Forest News

Forests Needed to Restore Eroded Mississippi Bluff Land

By E. L. Demmon, United States Forest Service

In the Mississippi bluff and silt loam upland region drastic measures are needed to overcome the disastrous effects of the soil losses that have taken place and to make possible the proper management of the land in the future.

Nowhere else in the Mississippi Valley, perhaps, have the effects of gullying been so severe as in portions of northwestern and central Mississippi. In this section of gently rolling upland, at one time held to be the best portion of the State for cotton growing, the soil stratum consists in a yellow or brownish loam originally from 3 to 7 feet thick. Originally this land was covered by an open forest of hardwoods and by an abundant growth of grasses that afforded excellent pasture to deer and cattle; it was a natural park, gay with flowers during the greater part of the year.

When this land was cultivated little or no attention was paid to the direction of the furrows. Usually plowing was done "uphill and down," and during the torrential summer rains the "dead furrow" resulted in the formation of washes that cut into the subsoil. Even when they had been filled with soil by plowing these washes would sometimes reopen during storms, shedding the soil in a muddy flood upon the lower lands. This erosion of the surface soil reduced th productivity of the higher lands and resulted in thei neglect or abandonment. The crusted surface she the rain water into the old furrows, which quickl developed into deep, wide gullies or "red washes and prevented any further cultivation. After a f years the soil stratum of brown loam was cut throu to the loose, or loosely cemented, and easily erode sand that underlay it almost everywhere. Then th run-off, increasing in volume as the gullies enlarge undercut the loam stratum and caused it to plung into gullies in huge masses which, together with quan tities of sand, were carried into the valleys belov filling the beds of the streams sometimes to the exter of obliterating their channels. As erosion progresse large areas of upland were completely denuded of the arable soil and left with a surface of bare, arid san wholly useless for cultivation. The valleys fared littl better; their native vegetation was destroyed, an they were left to the conquest of hardy weeds.

In some portions of the State whole townships the best class of upland have in this manner been trans formed into sandy wastes that can not be reclaimed b ordinary means. Erosion has wholly changed the ir dustrial conditions of entire counties; in some ir stances county seats have had to be changed becaus the old town and site had literally "gone down hill along with the rich agricultural soil. This destructio of lands was greatly aggravated during and just afte

e Civil War, when large areas of land once under cul-
ation were utterly neglected.

No adequate steps are now being taken in the Mis-
sippi bluff country to reclaim land that has suffered
m erosion after being cultivated or otherwise de-
ved of its protective cover. In the Yazoo highlands
asional small tracts of farm woodland can be found
ere fire has been kept out for a number of years and
litter has accumulated to a depth of 2 or 3 inches.
protected stands of timber amply demonstrate
effectiveness of a good forest cover in controlling
sion. In order to stop erosion in this region it is
olutely necessary that a new forest cover be estab-
ed on an extensive scale. Where erosion is in the
ly stages and seed trees remain from a previous
nd, the pine type may reestablish itself naturally if
is kept out. In the hardwood type and in the more
iously damaged lands in the pine type, many hun-
ds of square miles can be reclaimed only through
st planting. On the worst areas the technical
blems involved are extremely complex, and recla-
tion research is urgently needed. It is highly
bable that such engineering measures as the build-
of dams and terraces must precede attempts at
restation, and that tree planting must be accom-
ied by the use of aggressive grasses, vines, and
er herbaceous or woody perennials.

Once the steep-sided gullies and almost vertical
ffs are reduced by terracing or other measures to
pes that can support tree growth, and the soil is
d by means of a forest cover, this cover must be
efully maintained. Continued fire protection will
imperative, and selection cutting will necessarily
lace the clear-cutting at present common throughout
region.

ree Planting for Shelter in the Northern Great Plains

By Robert Wilson, United States Bureau of Plant Industry

For 15 years the Northern Great Plains Field Sta-
n of the Department of Agriculture, at Mandan,
Dak., has been experimenting in the planting of
es for the protection of farmsteads, orchards, and
dens in the semiarid sections of North and South
kota, Montana, and Wyoming. Its experience has
wn conclusively that in spite of the severe climatic
ditions a planting of trees can successfully be started
the average upland farm site of the northern Great
ins. Since 1915 the station has furnished trees,
ns, and directions for the planting of 2,700 shelter
ts on farms in this territory. Two thousand of these
ntings, some of them now 14 years old, are making
isfactory growth.

At present the station cooperates with about 250
mers each year in establishing new shelter-belt
ntings. These plantings are not intended to meet in full the needs of the individual farms for protection plantings, but are designed primarily as demonstrations of what can be done when the methods recommended are carefully followed. Only enough stock is furnished to each farmer to plant one complete unit of a shelter belt adapted to conditions on his farm. Usually this unit occupies from 1 to 2 acres of ground.

A planting intended to protect farm buildings and yard from winter storms is placed north and west of them so as to form a belt of uniform width in the shape of a right angle. If the location of the buildings makes it impossible to plant trees on two sides, the shelter belt may be laid out as a single strip on either the north or the west. A space of from 50 to 100 feet is allowed between buildings and the inside edge of the shelter belt. If enough space is available, the belt is made from 100 to 200 feet wide and is laid out to include a snow trap. The space between trees in a row may vary from 4 to 6 feet, and the space between rows from 8 to 12 feet.

A planting intended to protect a garden or an orchard from strong winds in spring and summer is best placed on the west and south, although shelter on the north and east is also of value. A planting for this purpose need not be so wide as that planned for the winter protection of buildings; often a belt of from one to five rows of trees is sufficient. A strip of ground 20 feet wide should be prepared for one row of trees, with an increase of 10 feet in width for each additional row. Because of the distance to which trees send out their roots in cultivated soil, it is best not to plant fruit trees or garden crops within 20 or 30 feet of the shelter belt.

Land on which trees are to be planted in the northern Great Plains region must first be prepared by tillage, because trees can not establish themselves in this region in competition with grass and weeds. Clean summer fallow during the entire season preceding the planting of trees serves the double purpose of killing grass and weeds and keeping the surface in condition to soak in as much as possible of the season's rainfall. If the land is in sod, it may need to be cultivated two years in preparation for tree planting. Cultivation must be continued for about five years after the trees are planted, or until they are large enough to shade the ground. Mulching has not proved a satisfactory substitute for clean cultivation. Fencing is usually necessary to protect the trees from livestock and rabbits, and it is recommended that a strip of ground along the borders of a planting be plowed as a provision against damage by fire.

The trees distributed by the Mandan station for shelter-belt planting are raised in a nursery at the station. To insure hardiness, seed of native tree species are collected locally and as far as possible seed of introduced species, also, are taken from blocks of trees growing at the station or from other plantings in the region. For broad-leaved species a well-grown, vigorous seedling 1 or 2 years old and 12 to 14 inches in height, or for conifers a transplant 6 to 12 inches in height, is chosen as the most desirable for shelter-belt planting.

In experimental plantings at the station about 90 forest-tree species are being tested for their suitability for planting on farms in the northern Great Plains region. Some 70 testing blocks containing in most cases 100 trees each were planted in pure stand in the years 1915 to 1922, principally to determine the hardiness of the species. In the years 1915 to 1917, 22 shelter-belt combinations were planted to test the ability of trees to grow in direct competition with trees of the same or of different species in adjacent rows and to test the reactions of trees to different spacings. Trials are being made also of different methods of cultivation and of pruning.

Species that have proved capable of successful planting in most sections of the northern Great Plains region include green ash, American elm, caragana, Russian olive, boxelder, cottonwood, northwest poplar, Chinese elm, blue spruce, western white spruce (Black Hills spruce), jack pine, Scotch pine, western yellow pine, tamarack, European larch, and red cedar. Trees tested by the Mandan station and found not to be adapted for general planting in the region are Norway poplar, Carolina poplar, Russian golden willow, and laurel willow.

Spray for Pine Needle Blight in Nurseries

For the control of pine needle blights in the nursery, such as the brown spot blight of the longleaf and other pines caused by Cryptosporium acicolum and the gray needle blight of pines caused by species of Lophodermium, Dr. George G. Hedgcock, of the office of forest pathology, Bureau of Plant Industry, makes the following recommendation:

> Spray every two weeks with a sprayer throwing a misty spray, beginning when the young needles emerge and ceasing when growth ceases. Use standard Bordeaux mixture 4–4–50, with the addition of 2 pounds of either whale-oil soap or a casein soap like "Kayso" to every 50 gallons of spray solution. The soap is necessary to make the spray adhere to the pine needles. Ordinary Bordeaux rolls off pine needles like water off a duck's back. I am quite certain that good results will be obtained by spraying thoroughly every two weeks during the growing period, quitting when the needles have hardened and growth has ceased. It is always well to leave here and there an unsprayed row as a check to determine the effect of the spray.

The Southern Forest Experiment Station has reported that longleaf pine seedling plots at Bogalusa, La., sprayed throughout the past summer with Bordeaux mixture or with lime sulphur showed scarcely a trace of brown-spot infection, although the unsprayed check plots were very thoroughly browned by the disease.

Forest Insects in 1928

By F. C. Craighead, United States Bureau of Entomology

[A report prepared for publication by the insect-pest survey]

The western pine beetle (*Dendroctonus brevicom* Lec.) epidemics, which in 1927 reached unprecedente proportions in southern Oregon and northeastern Cal fornia, showed a marked decline in 1928. On a large ar in northeastern California centering around the Mod National Forest this insect destroyed approximately per cent of the stand in 1921. The infestation graduall increased until in 1927 about 3½ per cent of the stan was destroyed. Practically 10 per cent of the volum of timber on the area surveyed—or, roughly, som 500,000,000 board feet—was destroyed. Our survey in the summer of 1928 showed that the losses for th year would be less than in any other year sinc 1921.

The mountain pine beetle (*Dendroctonus monticol* Hopk.) infestation in lodgepole, which has been pro gressing southward along the Continental Divide sinc 1909, has for the past two years been centered on th Bitterroot National Forest, Mont. The control projec initiated by the Forest Service in the Bighole Basin i an attempt to keep this epidemic from spreading t the east side of the Continental Divide and into th Madison, Gallatin, and Targhee National Forests wil have to be abandoned. The beetles have continue to spread into the zone of defense in such numbers tha the attempt to check their advance is hopeless.

* * * [Here Doctor Craighead noted the epi demic of the Great Basin tent caterpillar, discusse in this number of the Forest Worker by J. M Miller.]

The spruce budworm (*Cacœcia fumiferana* Cle has been especially destructive along the Shoshon River just east of Yellowstone National Park on a area of over 100,000 acres and on the Santa Fe Nationa Forest in New Mexico. In the southwestern corne of Yellowstone National Park along the Bechler Rive over an area of many square miles the lodgepole ha been completely stripped by the spruce budworm Although this insect has been recorded from pin before, such an extensive defoliation is unique.

A severe defoliation involving some 1,000 acres o the Lincoln National Forest, in the vicinity of Cloudcroft, N. Mex., occurred during the past season, supposedly being caused by a species of Ellopia. Dougla fir is the chief food plant.

An epidemic of the Black Hills beetle (*Dendrocton ponderosæ* Hopk.) on the Colorado National Fores has completely subsided, owing to effective contro measures.

Outbreaks of the southern pine beetle (*Dendroctonus frontalis* Zimm.) in the Southeast were extremely rare in 1928, as is usual in years of normal precipitation

The hemlock looper (*Ellopia fiscellaria* Gn.) has bee reported destructive in hemlock stands at a number o oints in New York, western Pennsylvania, and Ohio, lthough it is believed that it was not so abundant as n the preceding two years.

Again in 1928 there was heavy defoliation by Neoiprion dyari Roh. on the two and three needle pines n North Carolina in the vicinity of Asheville, and at oints in Massachusetts.

The European birch leaf miner (*Phlebatrophia matheni* MacG.) was unusually abundant throughout porons of Maine during the past summer. This insect as more in evidence than it had been in any previous ear.

The locust leaf miner (*Chalepus dorsalis* Thunb.) as again abundant in the Blue Ridge and Appachian Mountains during the past summer.

Reports of damage by the larch sawfly (*Nematus richsonii*) would indicate that it was probably not so bundant in 1928 as in other recent years.

The fir tussock moth (*Hemerocampa pseudotsugata* IcD.) has again been reported as very destructive, ven more so than in 1927, on the Humboldt National orest, Nevada, and the Weiser National Forest, Idaho. his same species has appeared in considerable numbers n the neighborhood of Puget Sound, Wash.

Toumeyella numismaticum P. and McD. has been ncreasing on the Forest Service plantations of jack ine on the Nebraska National Forest, at Halsey, Nebr. Several acres of pine 14 to 15 years old has een killed, and it was necessary to initiate control neasures last spring.

Rhyacionia frustrana Comst. has been recorded as ocally injurious in New Jersey, Massachusetts, and ouisiana during the past summer.

The needle tyer (*Eulia* sp.) infestation in the southest portion of the Yellowstone National Park, ich has destroyed the lodgepole over many square niles, practically subsided within the last year.

Termites continued their serious damage to the voodwork of buildings in the Southeastern, Gulf, Central Western, and Southwestern States, as well s in California.

Tom Gill Makes Survey of Tropical Forest Resources

Tom Gill sailed December 8 on the second annual ield trip of a survey of tropical forest resources which e is making for the Tropical Plant Research Foundaion and the Charles Lathrop Pack Forestry Trust. Mr. Gill began this work in 1927 when he went through he West Indies, Venezuela, and British Guiana. His tinerary this season leads to Cuba, Mexico, and Panma and includes the Maracaibo Basin in Venezuela, vhere work could not be concluded last year because f a shipwreck. In Cuba he will confer with Governnent foresters and in Mexico he will be joined by he Federal forester in a field trip in the southern part f the country. This year, also, he will study the methods by which tropical timber is being exploited in British Honduras, one of the few countries where this is being done according to forestry principles. For 1929 the plan is to visit the valley of the Amazon.

One purpose of this survey is to find substitutes for certain of our own fast-disappearing hardwoods. It is directed toward the acquisition of a working knowledge of the extent of tropical forests in Latin America, the amount of commercially valuable timber they contain, and the purposes for which tropical species may be used. Reconnaissance is made partly by airplane, but mostly by muleback and canoe. Mr. Gill's party usually consists of a guide, an interpreter, and about 20 Indians. Very often progress must be exceedingly slow because of the difficulty of cutting a way through the underbrush. The party must not be burdened with food supplies, and consequently subsists largely on game and wild fruit.

When an unidentified species apparently of commercial value is confronted, specimens are collected of the leaves, of the flowers and fruit if these are available, and of the heartwood. These are sent to the Yale Forest School for identification. Logs of the species apparently of greatest importance are sent out of the forests by pontoon or canoe to seaports and thence shipped to the United States to be tested. The tests of this timber, to determine its suitability for various uses, are made at the School of Forestry and Conservation, University of Michigan. Numerous photographs are taken, illustrating species characteristics and forest conditions. Economic information is collected from official sources—from commercial attachés and when possible from government foresters—and local uses of native timber are studied.

A fundamental difficulty in studying tropical forests is the chaotic condition existing as to common names of the species. One species may have as many as 20 local names, and often one species is supposed to consist of two or three.

Wherever he has gone in the Tropics, Mr. Gill says, he has found North American lumber—southern pines, Douglas fir, and redwood—being sold in the lumber yards in preference to local species, this not because of inferiority of local species but because of the absence of any organized lumber industry. The logging methods usually practiced in tropical regions of the Western Hemisphere are wasteful, uncertain, and expensive. Although it is generally true that the forests of these regions contain a great complexity of various species, Mr. Gill says, species known to be valuable do occur in almost pure stands of wide extent. Where this condition exists, logging is commercially possible. Where large numbers of species occur in mixture, commercial exploitation will probably have to await further study of the possible uses of many of the species. The present highly selective system of logging, removing only 2 or 3 per cent of the stand, makes for unjustifiably high logging costs.

Light Intensity and the Growth of Plants

By HARDY L. SHIRLEY, Boyce Thompson Institute for Plant Research (Inc.)

Things the forester needs to know about the rôle played by light intensity in the forest include not only what light intensity is needed by plants for survival but how the growth rates of plants are affected by the variations in intensity that occur in natural plant habitats, whether different species of plants differ as to the light intensity they require for survival, and whether they differ in their response to increments of light. Particularly is the forester concerned with finding what light intensity plants require for vigorous, healthy growth.

In a study of plant reactions to different light intensities carried out at the Boyce Thompson Institute for Plant Research, Yonkers, N. Y., plants were grown under cloth shades, both in the greenhouse and outdoors. In order that temperatures and humidities might be kept uniform, each shade was provided with forced ventilation. Tests were made with light intensities varying from 1 to 100 per cent of full sunlight. The amount of dry matter produced by the plants was taken as the criterion of their growth.

The light intensities found to be required for survival by most of the plants studied ranged from about 0.5 per cent to about 1 per cent of full sunlight. With 1 per cent intensity sunflowers failed to survive, while Galinsoga and avens survived and showed some increase in dry weight. Loblolly pine subjected to 1 per cent intensity survived for five months, but made very little gain in dry weight. Redwood plants with light of 1 per cent intensity survived seven months but then began to die, the dry weight of those surviving after the 7-month period being only slightly greater than it had been when the plants were first placed in the shade.

With only 1 per cent of full sunlight several plants such as buckwheat, Galinsoga, avens, and hog peanut were able to survive for a considerable period of time but were not able to produce fruit. On buckwheat and Galinsoga a few flowers were formed.

Dry matter produced by the plants during the winter was in most cases almost directly proportionate to the intensity of the light they received. During the summer under outdoor conditions a decrease to 50 per cent of full sunlight caused only a slight decrease in the growth of many plants. At 20 per cent of full sunlight, growth of most of the plants was considerably reduced.

Redwood grown outdoors showed maximum increase in dry weight at 50 per cent intensity, avens at 75 per cent intensity, and loblolly pine at 100 per cent intensity. When exposed to full summer sunlight, plants of all three species appeared to be stunted and developed considerable red pigment in the leaves, while those under shade showed the normal green color. Plants grown under shades in the greenhouse at the same time showed maximum increase in dry weight under the highest intensity available, 70 per cent of full sunlight. The higher temperature of the greenhouse seems to have been an important factor in the utilization of intense light.

For all plants studied, root development was greatest under the highest light intensity available. With variation from 20 to 100 per cent in light intensity, the ratio of dry weight of root to dry weight of top varied for redwood from 0.33 to 0.84, for loblolly pine from 0.11 to 0.42, and for avens from 0.37 to 0.84.

Optimum height growth of most of the plants studied occurred during the summer at a light intensity of 20 per cent—less than that at which optimum production of dry matter occurred. A further decrease in light intensity caused a decrease in the rate of height growth due to insufficiency of food supply.

Light measurements made in a hardwood stand near the Boyce Thompson Institute for Plant Research showed variations from 16 per cent in sun flecks to less than 1 per cent in the shade of 60-year-old yellow poplars. A dense stand of sumach allowed only 2 per cent of the light to pass through. Light measurements under a pine stand at Keene, N. H.—not a dense stand—showed from 2 to 6 per cent intensity.

These studies indicate the light intensity under ordinary forest canopies is usually so low as to be a decidedly limiting factor in the rate of growth of the under vegetation. Different species have different light requirements for survival and show different growth responses to increments of light. There are great differences, also, in the length of time different species can survive under intensities too low for growth.

Before the results of this work are applied to silvicultural practice, light-growth curves should be worked out for the species concerned and more measurements of light intensity should be made in the forest. It may be suggested that from the standpoint of light economy an acceptable system of forest management is the group shelter-wood system.

Physical Effect of Wind on Plant Growth

Results of a preliminary experiment to determine the physical effect of high winds on plant growth are reported by H. H. Finnell, director of the Panhandle Agricultural Experiment Station, Goodwell, Okla., in the Journal of the American Society of Agronomy. Two potted marigold plants were placed in front of a 12-inch electric fan, at a distance of 80 centimeters, and for 60 days were exposed to a wind having a velocity of about 15 miles an hour. Two plants that had been potted under the same conditions with the test plants and that appeared to equal them in foliage area and total height were placed in the same room but about 80 centimeters behind the fan, where the air was comparatively still. All pots were brought back daily to optimum moisture content, previously determined by repeated tests.

Difference in rate of growth between exposed and eck plants was measurable at the end of the first hours. The exposed plants showed an actual loss leaves, deformation of the main stem, and a curled d withered condition indicating that considerable pair of tissues was required. At first the wind-posed pots used considerably more water, but near e thirtieth day the check plants had so far outgrown ose exposed to the wind that they were using approx-ately the same amount of water as the latter, and ey continued to do so to the end of the experiment. he number of secondary branches formed was appar-tly increased 42.8 per cent by the wind. The per-ntage of dry matter was found to be consistently gher in all parts of the check plants, presumably ving to the fact that they reached a more advanced age of maturity rather than to any morphological odification from the effects of wind. Exposure to ind apparently postponed maturity about 10 days a 60-day growing period.

After the exposed plants reached a height of 50 ntimeters, which lifted the growing parts out of the ain air draft, they resumed normal growth.

reat Basin Tent Caterpillar Becomes Epidemic

By J. M. Miller, United States Bureau of Entomology

During 1928 unusual defoliation by the Great asin tent caterpillar (*Malacosoma fragilis* Stretch) curred in northern California and southern Oregon. he host plants of this insect consist mainly of species hat compose the brush cover of the forest regions on he eastern slope of the Sierra Nevada and Cascade ountains. Over large areas the brush cover was mpletely stripped, and in certain regions a serious ss of sheep forage resulted.

The caterpillars appeared in large numbers during he early part of the summer season. They ate almost very species in the brush cover, feeding upon ceano-hus, wild cherry, wild gooseberry, wild currant, spen, squaw carpet, wild rose, willow, and manzanita. Western chinquapin seemed to be the only plant of w shrubby growth that they passed up.

On July 9 the caterpillars in the vicinity of Truckee, n the Tahoe National Forest, were found to be trans-orming to pupæ, the feeding period being practically losed. They had spun numerous web tents on the lants on which they had fed. Many of the cater-illars spun their cocoons within these tents, but umbers scattered over the brush and spun their ocoons singly. Many caterpillars were found dead, robably of some bacterial disease. Occasionally a ocoon was found on a conifer, where an isolated aterpillar had climbed up on the foliage to pupate. There was no evidence of feeding on coniferous trees.

Moths were observed flying on the Modoc National Forest on August 12. General emergence everywhere was apparently over by August 15. Egg masses, deposited in bands half surrounding the twigs, were in evidence soon after the flight period started.

William Zeh, lumberman of the Indian Service, reported on July 5 as follows:

> In the northeastern portion of the Klamath Indian Reservation I noticed that all the bitter brush (*Purshia tridentata*) was defoliated by some tent caterpillar. This infestation then seemed to take in several of the townships extending around Wocus Bay. As this browse is the principal sheep feed on the reservation, the defoliation is working a considerable hardship on some of the sheepmen. The caterpillars did not even spare the manzanita, the ceanothus, or certain Ribes, but in places where the infestation was lighter only the Purshia tridentata was defoliated.

J. F. Kimball, of the Klamath Forest Protective Association, also reported the loss of $5,000 in revenues from sheep grazing on timber lands belonging to the association in southern Oregon.

There is no evidence that the brush cover will be killed as the result of one seasonal defoliation. It still remains to be seen whether these caterpillars will appear in sufficient numbers in 1929 to cause noticeable defoliations again. Such epidemics are usually short-lived, and a subsidence of the caterpillars can be expected in another season. Reports indicate that similar outbreaks occurred about 1920–21 and 1914–15.

A Forest Plantation in Ohio

In the last three spring planting seasons 300 acres have been reforested by the Marsh Lumber Co., Dover, Ohio, with the planting of about 300,000 trees. When examined during the past summer the plantations showed a survival of more than 80 per cent in nearly every portion and more than 90 per cent on some sites. Scotch and Norway pines have given better results than any other pines and the most successful hardwoods have been black walnut, white ash, black locust, yellow poplar, and sugar maple. Northern white pine, Norway spruce, and European larch have been found unsuitable to this particular planting site although they are doing fairly well elsewhere in the same county. The Marsh company reports that on its property trees planted in plowed furrows have shown very little advantage in early survival over trees set directly in the sod.

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Trees are being planted by the Youngstown, Ohio, Federation of Women's Clubs along the road from Youngstown to Boardman, as a memorial to the Youngstown men and women who lost their lives in the war. In 1924, 300 American elms were bought by the federation and planted in a grove from which they are being taken and set out as fast as the road grading permits.

Adverse Weather Augments Injury to Trees

By F. C. Craighead, United States Bureau of Entomology

During the past summer my attention was attracted by the great quantity of dead and dying incense-cedar reproduction on the Lassen, Plumas, and Modoc National Forests, in California. This condition was not confined to the east side of the Sierras; similar dying was reported to be prevalent on the Eldorado National Forest, particularly around Placerville, and on the Sequoia National Forest near Springville. On the areas that I examined these dead and dying trees varied in height from 1 to 6 feet. Occasionally a much larger tree was found dead, probably from a different cause. The local distribution of the affected trees was extremely erratic; occasionally a single affected plant would be found surrounded by healthy ones, but more frequently a clump of several plants or practically all individuals in a group of reproduction were dead or dying. Likewise there was no uniformity in the appearance of the dead and injured trees. Some had yellowed foliage, indicating recent death; others were entirely brown; and again some had no foliage, indicating that death had occurred a year or so previously. In most cases the plant was not entirely dead, the lower branches near the surface of the ground being still green. Occasionally only the top was affected.

On the Modoc National Forest some of these trees were examined. They were found to show only one consistent indication of injury, a scar or lesion from 2 to 3 inches long at the junction of the dead and living portions. This scar in most cases was two or three years old and had partially healed over. In some instances the healing was almost complete. The scars appeared to have been caused by some injury resembling sunscald or tramping or nipping by grazing animals. It was found, however, that in a number of cases—and this may be true of all—an incision had been made by one of the periodical cicadas in ovipositing. This cicada apparently was quite abundant on the Modoc two or three years ago.

Whatever the reason for the initial scar, the ultimate death of the tree or branch undoubtedly can be attributed to circumstances similar to those causing "red branch" of fir and "spike branch" of spruce in the Northeast. This characteristic injury of the fir and spruce in the northern forests has been traced to an initial feeding scar made by species of Monochamus and the subsequent drying out of the distal portion of the twig. To quote Doctor Faull: [1]

> The most frequent cause is a combination of two factors, namely, insect gnawing of the bark (which is almost invariably restricted to the lower surface and is by no means a girdling) and the subsequent "drying out" of the living tissues at the same level, a process that is favored by the action of frost and by the inactivity of these tissues during the fall and winter.

The same combination of causes explains the occasional conspicuousness of pitch-moth (*Pinipestis* sp.) injury on the Forest Service plantations at Halsey, Nebr. During the spring of 1928 the tops of a great number of Austrian and Scotch pines in these plantations turned brown. An examination in June showed that in all cases the affected trees had been partially girdled by pitch moth from one to four years previously. The low temperatures and high winds of the winter of 1927–28 undoubtedly had proved the undoing of many of these trees, which otherwise might have completely healed these scars in a few more years.

Unquestionably it is for the same reason that porcupine damage shows up more conspicuously some years. Tops that have been partially girdled are able to maintain growth until unusually adverse weather conditions arise, causing excessive desiccation.

Federal Action Urged to Check Larch Canker

Action by the Federal Government to stamp out the European larch-canker disease is urged upon Congress in a resolution signed by representatives of the Forest Research Council of the Pacific Northwest, the forestry committee of the Portland (Oreg.) Chamber of Commerce, and the West Coast Lumbermen's Association. The resolution was adopted at a meeting held in Portland October 25, after an address by Dr. Haven Metcalf, chief of the office of forest pathology, Bureau of Plant Industry. Doctor Metcalf explained that a serious menace to Douglas fir, western yellow pine, and other valuable timber species of the West is involved in the appearance of the larch canker in Massachusetts and Rhode Island. The disease may spread to the West either by direct importation or by slow migration through the northern tamarack belt, which is continuous from the Atlantic coast to western Alberta. In the Northeast it has been found only on planted trees and on the native tamarack, which is economically unimportant. Because of the absence of valuable forests of its host species in the East, Eastern States and property owners have no immediate incentive to undertake its control. The Federal Government has no authority to destroy the infected trees, and as yet Massachusetts and Rhode Island have not acted to stamp out the disease or to prevent its spread from their borders.

In Europe, where it has been known for a century, the larch-canker disease kills some trees and disfigures many, but is not serious enough to exterminate the larch. It has been found on Douglas fir and Sitka spruce in Europe. The disease has no alternate hosts, and Doctor Metcalf states that he can not imagine any possible control measures by which it can be stopped if it once gets into the western forests. He estimates that it will kill a large tree in 10 years.

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[1] Faull, J. H.: Report of the Minister of Lands and Forests, Province of Ontario, 1922.

Little Falls Municipal Forest

By R. R. Fenska, New York State College of Forestry

As far back as 1896 the city of Little Falls, N. Y., was purchasing lands with the view of ultimately controlling the watershed of the neighboring Spruce and Beaver Creeks. To-day the water supply of this city of 14,000 population is protected by municipal ownership of 4,003 acres of land at the headwaters of the two creeks.

The following summarizes the present forestry conditions on this municipal watershed property:

	Acreage
Mature timber (selection forest of mixed hardwoods and softwoods)	1,200
Immature timber (mixed hardwoods and softwoods)	1,100
Plantations (pine and spruce)	845
Nonforested land	858
Total	4,003

Up to 1927 the 1,200 acres of mature timber was a very lightly culled forest of spruce, balsam fir, hemlock, yellow birch, maple, and beech. A careful cruise showed that it was about two-thirds hardwoods. The spruce, the most valuable element in the stand, averaged 15 to 20 inches in diameter at breast height and was of high grade. A large percentage of the hardwood timber was mature and averaged 20 inches D. B. H.

In 1926, under the direction of a forester, 5,000,000 board feet of timber, including both softwoods and hardwoods, was marked for cutting. This timber was so selected that its removal will not in any way impair the value of the area as a protection forest. Logging began in the fall of 1927 and will continue until the spring of 1929. The timber has been sold to a concern specializing in high-grade lumber for piano sounding boards. The revenue from the sale will reimburse the city for the purchase of the land and timber.

The contract under which this timber is being cut is similar to the contracts under which the United States Forest Service sells national forest stumpage. Young reproduction already on the ground, together with the seed in the duff, will insure rapid regeneration on the areas left open by the cutting of merchantable trees. To increase the percentage of spruce in the new stand all skidding and hauling roads will be planted in the spring of 1929 with spruce transplants.

The 1,100 acres of immature timber will be ready for a selection cutting in about 28 or 30 years.

During 1928 a quarter of a million trees were planted on open portions of the Little Falls forest. Since 1916 there has been established on the forest a total of 845 acres of forest plantation. The species planted are northern white, Norway, and Scotch pine and red and Norway spruce, with a few northern white cedar, black locust, and Carolina poplar. The average cost of reforesting these 845 acres has been $10 per acre. The plantings made during 1927 cost only $8 per acre. The plantations, now ranging from 1 to 11 years in age, are all in a thrifty condition. The older pine plantations average from 20 to 25 feet in height.

The present program calls for the planting of from 150,000 to 250,000 trees each spring until the remaining 858 acres of abandoned farmland are reforested.

Denver Plants Trees on Watershed Areas

A watershed-protection program initiated by the Denver, Colo., Chamber of Commerce three years ago has resulted in the planting of about 20,000 western yellow pine seedlings on watershed areas close to the city. The work has been carried on with the cooperation of various young people's organizations. In May of 1928, for example, 2,000 seedlings were planted by boys of the Order of De Molay in Red Rock Park; 1,000 by the boys of the senior class of Manual Training High School, in Dicks Park; 1,000 by the Camp Fire Girls, on Inspiration Point; and 1,000 by the Garden Club of Denver.

The three years' plantings, which have been made in various locations and under varying conditions, show an average survival of about 65 per cent. These results have encouraged the forestry committee of the chamber to develop a program of planting for the whole of the city's watershed.

Slash Pine Seed Collected in Abundance

Slash pine seed were collected in South Carolina, Georgia, and Florida last fall more easily and cheaply than ever before. The cones were unusually abundant and were gathered without difficulty from trees thrown by the tropical storm. The Georgia State College of Agriculture collected a quantity of the seed, chiefly in order to help farmers get supplies at low cost. Seed dealers and owners of timberlands took advantage of the extraordinary crop to collect large quantities of the seed of this tree which possesses remarkable qualities of rapid growth, high grade of wood, and large yield of crude turpentine—and which is propagated from seed as easily, and may be set out as successfully, as cabbage or tobacco. Slash pine is native to the coastal plain region from South Carolina to the Mississippi River. It appears to be adapted to the maritime portions of North Carolina, of western Louisiana, and of southeastern Texas.

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In a 4-year-old plantation of Scotch pine on lands of the Rockhill Coal & Iron Co., Huntingdon County, Pa., many trees grew 36 inches in height in the 1928 growing season. The average height growth for the plantation in that year is reported by the company's forester, De Lanson Lenhardt, as 23 inches.

A plantation made by this company in 1921 is of pitch pine and northern white pine in mixture by rows. The mean annual height growth of the pitch pine is shown by recent measurements to have been 14.2 inches, that of the white pine 10.5 inches.

A Forest-Fire Torch

A torch specially adapted for use in back-firing, in burning slash, or in burning out mossy trees has been put on the market by the manufacturer of a railway signal fusee that was recently tried out in forestry work by organizations cooperating with the Pacific Northwest Forest Experiment Station. Reports by foresters in the Northwestern States and in British Columbia who took part in these tests, summarized in the FOREST WORKER of May, 1928, stated that the fusee was found satisfactory in igniting light materials such as grass, needles, and duff under fair to good burning conditions; was decidedly more satisfactory than matches or pitch splinters; and was found exceptionally convenient in that it is easily carried and may be gotten into action very quickly, provides light in back-firing at night, and requires no matches. The standard railway fusee was found not to provide the volume of heat required when fuels are damp or where relatively little fine material is present, and did not prove effective in igniting logs and similar coarse material.

In line with the suggestions arising from these trials the manufacturer has made the following modifications in the railway fusee to produce a "forest-fire torch": The caliber has been increased to seven-eighths inch; the volume of flame is increased 36 per cent; the temperature of the flame is above 2,000° F.; the burning time is more than 10 minutes; a tin ferrule handle (in place of the spike) has been provided for insertion of a stick when one is needed for a handle; and smaller containers are used, for convenience of issue and transportation.

The torches can be supplied packed in lock-corner wooden boxes of 24 or in larger cases holding six small boxes of 24 each.

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Five hundred United States marines and seamen assisted in fighting the disastrous fires that occurred in 1928 on the Cleveland National Forest, Calif. An offer of the services of 100 British seamen was received from Vice Admiral Cyril T. M. Fuller, Royal Navy, commandant of the American-West Indies Squadron.

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A tract of virgin timber on the outskirts of the borough of Clarion, in western Pennsylvania, has been dedicated to perpetual use as a public park or forest. This tract of 30 acres, known as Wilson's Woods, was donated by S. W. Wilson. It is owned and managed by the Clarion Forestry Association, which was incorporated primarily for this purpose.

Some Growers of Christmas Trees

Raising Christmas trees has turned out to be mo
profitable than dairying in the experience of a lan
owner at Pocono Lake, Pa. Since beginning to rai
the trees on a large scale this man has reduced his 3
head dairy to 7. A fair share of the trees produced
the 2,400 acres that he devotes to the purpose ha
come from a native red spruce swamp, but the majo
have been planted in the fields. Most of the fields
covered with sod. The sod has not interfered wit
the growth of the evergreens, consequently cultivati
has not been necessary.

A landowner near Reading, Pa., has successfull
raised Christmas trees on 1,000 acres of rough, ston
ground where hardwood reproduces rather rapidl
Here it is necessary after setting out the young trees
go through the area once or twice during the first thr
seasons of the trees' growth in the field and cut t
young oak, maple, beech, and birch reproduction th
is inclined to take possession of the ground before t
young evergreens become established.

The owner of an 80-acre farm of high-priced la
near Lionville, Pa., has had his land in no other cr
than Christmas trees for the last 20 years.

L. H. Buzzell, of Elkins, W. Va., after visiting the
three plantations last summer determined to ma
Christmas-tree growing the sole activity on his far
Extension Forester Skuce reports. In the spring plan
ing seasons of 1927 and 1928 Mr. Buzzell had alread
planted 60,000 Norway spruce and Norway pine.

An Early Conservation Measure

Block Island, a part of Rhode Island lying abou
miles off the south coast of the mainland, was settl
in 1661 by 16 people from Braintree, Mass. Ear
historical references indicate that it was fairly w
covered with such trees as oak, elm, ash, pine, hickor
cedar, and alder. Wood was the only material us
for fuel. As the land was cleared for farming, it a
pears, some scarcity of timber developed. In 172
when there were perhaps 30 families on the island, o
Simon Ray proposed that in order to conserve wood
article be enacted in the town warrant limiting t
height of fences to 4 feet. Of the people present at t
town meeting at which this was proposed 17 voted y
and 4 no.

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The national parks had 2,522,188 visitors during t
travel season of 1928, or 167,545 more than in 1927.

Foreign Notes

Large Plantings in New Zealand

Forest plantings in New Zealand in 1927 covered 78,380 acres, more than doubling the 1926 record, according to a report of the American trade commissioner. The State forest service added nearly 4,000 acres to its record of the previous year by planting 19,924 acres in 1927, and the farmers' quota rose from 2,800 acres to 7,040 acres. The tree-planting companies and syndicates, after not quite matching the State plantings in 1926 with 15,826 acres, broke away in 1927 to establish a total of 49,824 acres.

The commercial tree-planting organizations whose development features the prodigious growth of the afforestation movement in New Zealand since 1923 are formed on two different plans. The first plan is that of the joint-stock company, under which the forest property is vested in the company and shares of the profits are received by shareholders according to the amount of capital they have contributed. Under the second plan the investing public do not become shareholders; the company contracts with each investor, for a certain cash payment, to convey to him at the end of a given term a certain area of land planted according to a prescribed agreement. The interests of the investors are watched over by trustees appointed by them, and the lands concerned are conveyed by way f mortgage to the trustees until the time for conveyance to the investor arrives.

A recent report from the American consul in Wellington states that the State forest plantings in the year 1927–28 totaled about 35,000 acres.

Reclaiming Waste Land with Forest in Holland

In the region of the Peel in Brabant (Netherlands) reclamation of about 40,000 acres of sand and marshland has been undertaken since 1900 by the Nederlandsche Heidemaatschappij. First, roads were built across the region, then the country was drained by means of ditches and canals. After the surplus water was drawn off, the parts of the region to be devoted to forestry and to agriculture were chosen. On the areas chosen for forestation 2-year-old Scotch pine was planted 16,000 to the hectare, or pine seed was sown at the rate of 4 kilograms to the hectare.

First thinnings are made at 15 to 20 years, and additional thinnings every 4 years thereafter. Slash from the thinnings is scattered. The mines of Limbourg are near by and there are neighboring regions without forest, so that the products derived from the thinnings have a good market. The plantations when visited in 1928 were in very good condition and were contributing to the economic transformation of a large region.

In some places American oaks have been used successfully for planting. They have done well even as an understory to Scotch pine. On the good soils, however, beech and fir are used for the understory. The oak, beech, and fir are sowed, and across the sowed strips 2-year-old Douglas fir and Japanese larch are planted, the idea being eventually to obtain a mixed forest of these species and Scotch pine, or at least in the first rotation to get soil improvement and make natural regeneration of the pine possible.

Forest Planting in England and Wales

Sixteen thousand acres were planted with forest trees last spring by the British Forestry Commission in England and Wales, according to a London correspondent of the Timberman. Since 1920 the commission has planted 80,000 acres. In its various nurseries 87,000,000 seedlings are now lined out, and 44,000 pounds of hardwood seed and 5,000 pounds of conifer seed were sown last spring. For all plantings of native species, including Scotch pine, the commission does its own seed collecting and extracting. Seed of Douglas fir and Sitka spruce and a few other nonindigenous species are imported.

Thetford Forest, Norfolk, the largest unit controlled by the commission, has now grown to 26,500 acres, and about half of this acreage has been planted. Here is located the largest forest nursery in the country, in which the commission raises more than two-thirds of the conifer plants it requires. The forest has its own sawmill and creosoting works.

At Thetford Forest, it may be remembered, the Government is developing a scheme of forest workers' holdings. Units of about 10 acres each, with houses and farm buildings, are rented to men to whom the Government guarantees 150 days' forestry work a year. One hundred such holdings have been established at Thetford Forest, and the number is soon to be increased to 130. At the busiest periods, November to March and June to August, from 300 to 400 men are employed on the forest. Similar centers of afforestation are being developed at Allerston, in Yorkshire; at Hamsterly, in Durham; at the Mortimer Forest on the Shropshire and Radnor borders; and at several points in north Wales

Mechanical Sower for Small Pine Seed

At the instance of Messrs. Massart and Misson of the Administration of Forests and Waters of Belgium a successful mechanical sower has been constructed for the planting of Corsican pine seed. This machine, which is described by M. Misson in the July, 1928, Bulletin of the Central Forestry Society of Belgium, has been tried out successfully and has planted at the rate of 1 to 1½ hectares per day, using 1 kilogram of seed per hectare. The planting is done in strips about a meter apart. Plantings made with this machine in the communal forest of Hechtel in April, 1928, resulted in a full stand of seedlings.

The seed are distributed through the rotation at the bottom of the seed reservoir of a wooden wheel, 4½ centimeters in thickness and 13 centimeters in diameter, on the circumference of which are seven notches each designed to pick up a single grain at every revolution of the wheel. This wheel is turned by means of a chain attached to the hind wheel on which the apparatus is mounted. The hind wheel is 1 meter in circumference, so that the seed are planted at the rate of seven to the meter. Two rubber brushes, one at each end of the reservoir, push the seed against the wooden wheel. A small plowshare placed just in front of the funnel which discharges the seed makes a furrow about 1 to 1½ centimeters deep and a moldboard placed laterally pushes the soil over the seed. The hind wheel, which is large and heavy, acts as a roller. The machine weighs only 25 kilos and can be drawn by one man. Although constructed for the sowing of Corsican pine it can be adapted for sowing other species.

Spark Arresters Not Enough

British Columbia loggers are warned by the forest branch of the Province against putting too much faith in spark arresters. In 1927 the branch made a study of the operation of various types of spark arresters in use on donkey engines in a number of representative logging camps, and found that any one of them would emit sparks which, under favorable conditions, would start fires. The study points to the necessity of keeping the area immediately surrounding the spark arrester wet down when operating in dry weather, especially during periods of low relative humidity, and to the necessity of keeping close watch on the physical condition of the arrester.

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From 1900 to 1927 the French Government authorized the clearing of about 21,000 hectares of land and reforested 86,000 hectares. In addition 50,000 hectares of private land and about the same area of communal and other public land were reforested through the aid of Government subsidy.

Reproduction on Spruce Lands Cut Ove for Airplane Stock

More than 1,000 young trees per acre are growin on most of the land on the northern coast of Britis Columbia that was logged during the war for ai plane spruce, it appears from the results of a study mac in 1927 by the British Columbia Forest Branch. Car ful tallies were made on 60 representative areas the Queen Charlotte Islands and in the Ocean Fa district, and a less intensive check was made on abou the same number of areas. The data indicate tha there are more than 1,000 seedlings per acre on 6 per cent of these cut-over lands, and more than 50 seedlings per acre on 80 per cent of them. The area studied have been almost free from fire.

Spruce was found to compose 31 per cent of th reproduction on these lands, hemlock 38 per cen and cedar 31 per cent. It is thought likely that a the stands become older the superior vigor of th spruce will enable it to crowd out some of the slower growing hemlock and cedar.

Canadian Pulp and Paper Output

Exports of pulpwood, pulp, and paper from Canad in 1927 brought $192,336,435 into the country, th Dominion department of the interior reports. Onl $12,877,071 worth of pulp and paper goods was imported into the Dominion during the year. Pape remaining in Canada for home consumption amounte to about 529,000 tons and was valued at $38,807,861 The net value created in the utilization of the pulpwood averaged $38.98 a cord.

Paper Pulp from Bamboo

The suitability of bamboo for pulp manufacture wa demonstrated by the Forest Research Institute, Dehr Dun, India, through tests on a semicommercial scal begun in 1923 and continued for four years. Th results confirmed those of earlier laboratory experiments by indicating that it is not necessary to rejec the nodes; that all the predominant species but one and culms of different ages, can be mixed indiscriminately for chemical treatment; and that uniform yiel and quality of pulp can be obtained by adopting th fractional system of digestion combined with th sulphate of soda method. Bamboo fiber was demonstrated to be suitable for all classes of paper, fron brown kraft to high-class writing paper. Experiment indicated also that bamboo pulp is suitable for th manufacture of artificial silk and, in fact, for industria applications as varied and extensive as those of woo pulp.

The bamboo forests of India and Burma cove thousands of square miles and are capable of yieldin several million tons of pulp per annum.

orest Protection Against Torrents and Avalanches in the Pyrenees

To protect the lines and stations of two railroads tween France and Spain through the Pyrenees, the anish Forest Service has been carrying on extensive forestation and engineering works. The site of the orks is very unfavorable to the establishment of tree wth, but the need was judged sufficient to warrant avy expense. It is the opinion of those engaged the job that the engineering works "have only a ansitory character" and that the only permanent medy lies in reforestation; that reforestation is the ly remedy against "flying avalanches," the formation which is completely stopped by forest stands; and that e forest once established will not require maintenance but will be capable even of producing a revenue. ying avalanches are those formed of great masses of wdery snow carried by the wind like waterspouts at a.

At elevations above 1,600 meters in this region the owing season is only from mid-July to the end of ctober. Consequently the annual growth is small. nd some of the planted trees are lost because of the eight of the snow, the fall of rocks, and the passage avalanches. At these elevations mountain pine and rch were planted; at lower altitudes Scotch pine, ustrian pine, Banks pine (jack pine), fir, and spruce ere used. Willows were planted in the eroded places nd other hardwoods on the borders of ditches and ads. Old sprouts of beech were cut and natural reneration of boxwood and hazel tree was encouraged. n planting 110 hectares 3,850,000 young trees were sed, 5 trees being planted together in a spot.

The engineering works established along with this forestation consist chiefly of masonry barrages or arrages of dry stone and fascine work constructed to eck the flow of water in torrents or the sliding of ow in avalanches. Also roads have been built across e drainage so as to check avalanches.

Forest Area of the British Empire

The total forest area in the British Empire is 1,910,000 uare miles, according to reports presented to the ritish Empire Forestry Conference recently held in ustralia. Merchantable timber stands cover 624,000 uare miles. Only 214,250 square miles is definitely edicated to timber production. The total timber and is 386,300,000,000 cubic feet, almost evenly diided between softwoods and hardwoods. The annual ut is about 3,600,000,000 cubic feet, 55 per cent being ftwoods. The three Governments of Great Britain, outh Africa, and New Zealand planted 89,000 acres of rest in the fiscal year 1928, as compared with only 3,000 acres in 1923.

Plans of Belgian Nature Protection Committee

The Belgian Committee for the International Protection of Nature, established unofficially in 1925 and incorporated with the approval of the Government in February, 1926, aims through publicity to create in Belgium a movement to improve and protect the beauty of parks, forests, and public gardens and to provide legislative measures that will promote this policy; and through research, educational propaganda, and cooperation with similar institutions in other countries to preserve botanical and zoological species threatened with extinction. The committee has already influenced the Government to create several large natural parks in the Congo and has brought about improved hunting regulations and other measures protecting the fauna of the Congo. As a basis for establishing a judicious forest policy in the Congo the committee has undertaken to collect data that will permit the publication of a forestry chart of tropical Africa in general, and the Congo in particular, and to compile all available information on the forest policies adopted in other countries and the results obtained through these policies. The committee proposed at the end of 1928 to begin publication of a periodical devoted to questions pertaining to the protection of fauna and flora. For this purpose it decided to create a separate organization known as the Office International de Documentation et de Corrélation pour la Protection de la Nature, which will be located in Brussels until the International Congress of 1930 at Amsterdam.

Institutions enrolled as members of the committee include the following: Société Royale Zoologique de Belgique, Société Royale Botanique de Belgique, Musée Royal d'Histoire Naturelle de Belgique, Jardin Botanique de l'État, Cercle Zoologique Congolaise (Musée du Congo Belge, Tervueren), Laboratoire Zoologique Torley-Rousseau (Universite de Bruxelles), and Saint-Hubert Club de Belgique. The president is Edm. Leplae, president of the Scientific Association of Agriculture in Tropical Countries, professor at the University of Louvain, and general director of the Agricultural Department of the Ministry of Colonies. The general secretary is J. M. Derscheid, F. Z. S., secretary for Europe of the International Committee for the Protection of Birds.

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In the Parana Delta of Argentina there are more than 100,000,000 planted cottonwood trees. These are handled on an average rotation of 10 years. Their total value, not counting the land, is estimated at 300,000,000 pesos (the Argentine peso is the equivalent of $0.965).

Why Are the Russian Steppes Treeless?

As in the case of the American prairies, many reasons have been advanced to explain why there is so little tree growth on the steppes of southeastern Russia. In this region, which extends north from the Caucasus Mountains over distances ranging beyond 500 miles, tree growth is largely confined to river banks and ravines. The main factors militating against the occupation of the steppes by forests, according to the views of various Russian foresters and ecologists, have been formulated as follows by Boris A. Keller, professor at the Agricultural College, Vorónezh:

1. A lack of moisture, in conjunction with the characteristic fine-grained steppe soil. On the steppes, as compared with the forest, precipitation is lower by from 4 to 8 inches, more of the water is lost to the soil through immediate evaporation as a result of the strong winds, penetration to the deeper layers of the soil is hindered by the fine-grained nature of the surface, and the water that does penetrate can not be so completely utilized by the root systems.

2. The characteristically strong steppe winds, with their direct influence on transpiration. Wind is, in general, the greatest enemy of trees, and not only the dry southeast winds of summer but probably also the winter winds have a great influence in preventing the spread of trees over the steppes, as over the northern tundra. Even in the leafless state trees may lose considerable quantities of water.

3. The presence of large quantities of easily soluble salts harmful to forest vegetation. Alkali areas occurring in the forest are usually barren of tree growth, and trees adjacent to them are dwarfed, of poor growth, and usually with much dead wood in the top.

4. Probably, competition with grasses. Sowings of tree seed in typical Stipa steppes have resulted in failure.

In the drier parts of the steppe zone the distribution of forest corresponds closely with the distribution of moisture except in the region of transition from forest to steppe, where the forest invades the plateaus from the river valleys and can to a certain extent prepare conditions for its own successful advance. (Thus the wind has less effect on a close-set phalanx of trees than on isolated individuals, and snow collects along the edge of the forest. The snow water moistens and leaches the soil, leading to podsol formation. This, like the shade of the trees, is inimical to the grasses.)

In the northern steppe the advance of forest on steppe has been marked, but appears to have been limited by fire. The fire might have originated from lightning. It is possible also that fires were started to get early spring forage. Records show that fire was used by the Moscow Kingdom in order that the invading Tartars might not be able to find fodder for their horses.

"We can not regard the problem of the causes of the hindrance of the advance of forest on steppe as definitely solved," wrote Professor Keller. "The relative importance of the single factors has not be settled. Especially, little attention has been devot to the different species of trees in this connectio The causes of the failure of the pine, for instance, spread on to the steppe may be quite different fro those hindering the advance of oak or aspen. Certain trees exist or could be produced, well adapted to occu steppe. Even in desert such trees as Arthrophytu are able to invade. But the steppes are geological recent and the available trees are few and are adap on the whole to a damp climate."

Forest Planting in South Africa

The forest-planting program of the Union of Sout Africa has progressed rapidly in recent years. Th objective of 10,000 acres a year has several times bee surpassed by nearly 50 per cent. During the yea ending March 31, 1927, the department of forestr planted 15,642 acres. On 86 per cent of this acreag conifers were used, chiefly P. pinaster, P. insigni P. canariensis, P. Hamiltonii, and P. muricata. Som P. patula, P. taeda, P. longifolia, and P. caribaea als were set out. The rest of the plantations were largel of eucalypts. The Monterey pine continues to be favorite. Trees of this species planted in South Afric have achieved heights of from 100 to 125 feet in 1 years' growth. Slash pine is coming to be highl regarded in certain situations. More than 40,00 pounds of tree seed was collected and sold during th year, a large part of this being Cedrus deodara an Acacia mollissima. For local use 23,000 pounds o Pinus pinaster seed was collected. Most of this see came from plantations. Seed that proved to b fertile was collected from shortleaf pines 12 to years old.

Rainfall and Rate of Tree Growth

Measurements of the annual growth rings of oak an yew trees in the Forest of Dean, England, supplied b E. G. Burtt and published in the Meteorological Magazine (London), were found to show no such distinct correlation between rate of tree growth and amount o rainfall as studies by Prof. Ellsworth Huntington o Yale have revealed in the case of the bigtree. Th measurements were studied in comparison with a serie of rainfall values for the Forest of Dean extending from 1820 to 1920, calculated by Dr. J. Glasspoole and expressed as percentages of the normal for the 35 year 1881 to 1915. The 200-year-old yew tree examine afforded very little if any evidence of a relation betwee growth in any one year and rainfall in that year. Data smoothed over 10-year periods gave some indication that heavy rainfall was inimical to the growth of the yew. Study of two oak trees revealed no definite evidence of relationship between rainfall and growth. Growth-rate curves for the oaks were far more irregular than the curve of the yew.

tump Removal with Saltpeter and Fire

The public-works service in Indo-China has experiented in removing tree stumps with saltpeter and e. The test was made at Dong-Me on about 5,000 umps of 13 species. The trees (0.3 meter and more diameter) are cut at 0.6 meter above the ground in ne and July when the sap has risen. Immediately ter the felling a vertical hole is made by means of auger at the center of the cut surface and about 10 ams of saltpeter is dropped into the hole. The hole then tightly plugged with a piece of wood. At the d of the dry season the stumps are surrounded with y wood and brush, which is set afire. Though with me species the burning is not complete and the umps have not been killed by the saltpeter, most of e stumps are consumed slowly and completely down the ends of the roots. Stumps that were entirely nsumed in the test were those that had no sprouts d appeared to have been killed by the saltpeter; ose with sprouts were not consumed. The cost of e operation is small compared to that of removing umps by the usual methods.

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In 1928, as in 1927, Armistice Day celebration plans France included the planting of trees. Departental and communal authorities and veterans' assotions cooperated in arranging for tree planting by hool children, choosing sites in the vicinity of monuents dedicated to the war dead.

The Forests of Denmark

Only about 8 per cent of the area of Denmark is in forest or woodland, the total forested area being about 1,850,000 acres. Of this total about 18 per cent is State owned, 3 per cent is municipal property, and 7 per cent belongs to the Dune Inspectorate. More than one-third of all the privately owned woods, or about 250,000 acres, is in units of less than 150 acres. Beech and spruce are the prevailing forest tree species of Denmark, 41 per cent of the forest area being in the former type and 27 per cent in the latter. Oak stands occupy 5 per cent and other hardwoods 6 per cent of the forest area; the mountain pine, used in dune reclamation, covers 17 per cent of it.

The State forests are under the charge of a directorate that is responsible to the Ministry of Agriculture. They are divided into 30 districts having areas of from 2,000 to 8,000 acres, each of which is under the direction of a superintendent

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Canadian mills produced 212,177 tons more of newsprint in the first nine months of 1928 than in the corresponding period of 1927. This constituted an increase of 14 per cent in the Canadian newsprint production. During the same period the United States output was 88,063 tons, or 8 per cent less than in 1927. The total North American output increased during the period by 5 per cent.

Personals

Ralph F. Wilcox has been appointed State forester of diana, the position in which he has been acting since was resigned by Charles C. Deam. Joseph F. aylor, forester in charge of nurseries, has been apinted assistant State forester.

W. G. Wahlenberg has resigned as assistant silviculrist at the Southern Forest Experiment Station, fective March 1, in order to accept a position as rester with the Eddy Tree Breeding Station, Placerlle, Calif.

Justus F. Muller has taken the position in the deartment of zoology, Roosevelt Wild Life Forest Experient Station, from which Alvin G. Whitney resigned join the faculty of the School of Forestry and Conrvation, University of Michigan. Doctor Muller ceived the A. B. degree from Johns Hopkins Uniersity and the A. M. and Ph. D. degrees from the niversity of Illinois. He has served as scientific ssistant with the United States Bureau of Fisheries nd the Natural History Survey of Illinois.

H. H. Tryon, formerly extension forester of South Carolina and now forester of a 4,000-acre estate near Cornwall on the Hudson, N. Y., owned by Dr. E. G. Stillman of the Rockefeller Foundation, reports that he is developing what promises to be a splendid example of two-storied hardwood forest. The estate offers an opportunity, Mr. Tryon says, for studies of forest growth such as have never been carried out in the region with the exception of some preliminary work done by Roy L. Marston 20 years or longer ago. The trees are mostly mixed oaks and hickory, with some ash, yellow poplar, and hemlock in the bottoms.

In early April Mr. Tryon will give a short series of illustrated lectures on the forests and forest conditions of South Carolina to the forestry students of Cornell University.

William Maughan, since 1925 an instructor in forest engineering at the New York State College of Forestry, has entered the Yale Forest School to work for the M. F. degree.

L. H. Pennington and H. P. Brown, of the faculty of the New York State College of Forestry, are each entering upon a year of sabbatical leave. Doctor Pennington will be engaged in completing and preparing for publication a thesis on the epidemiology of white-pine blister rust, to be published by the Department of Agriculture; Doctor Brown plans to complete his work on a manual of Indian timbers, prepared in collaboration with R. L. Pearson, director of the forest products laboratory at Princes Risborough, Hants, England. This manual was projected six years ago when Doctor Brown and Doctor Pearson were both stationed at the Indian Forest Research Institute at Dehra Dun, India.

Eugene C. Auchter, professor of horticulture in the University of Maryland and chief horticulturist of the Maryland Experiment Station and the Maryland Extension Service, has been appointed principal horticulturist in the Bureau of Plant Industry. He is in charge of the bureau's newly created office of horticultural crops and diseases.

H. B. Somerset, of Melbourne, Australia, has joined the pulp and paper staff of the Forest Products Laboratory, Madison, Wis., and will work at the laboratory for a year before returning to Australia to take a position in a paper mill operating on Eucalyptus. C. Ellis, forest economist to the forest service of Queensland, Australia, will make his headquarters at the laborato for the next year or so, studying its organization ar methods and using it as a point of departure for tri to wood-using industries of the United States ai Canada. J. Wiertelak, assistant in the institute chemistry, University of Poznan, Poland, has come the laboratory on a scholarship of the Polish Minist of Education and will spend a year there in studies pri cipally dealing with the chemistry of wood. Oth foreign investigators working at the laboratory incl K. Kuoppamaki, mechanical engineer from Finlan who is studying the manufacture of plywood; J. Cummins and H. E. Dadswell, of the Commonweal Council for Scientific and Industrial Research, Austral who are nearing the end of a 2-year study; and Ca Gustaf Strokirk, Harnosand, Sweden, who is studyi plywood manufacture and other wood-utilization pro lems on a grant from the University of Commer Stockholm.

Ira T. Yarnall, supervisor of the White Mounta National Forest, N. H., has been transferred to Was ington, D. C., as assistant district forester of the Ea ern National Forest District in charge of lan James E. Scott, formerly in charge of public-relatio work in this district, succeeds Mr. Yarnall as fore supervisor.

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The Best Forage Species not Always Handicapped by Overgrazing?

By W. A. Dayton, United States Forest Service

The old adage "Tot homines, quot sententiæ" seems to apply even in some matters that have been made the subject of close and careful observation. In our Western States it is held to be almost axiomatic that overgrazing favors inferior forage species at the expense of the most palatable ones; yet in England, it appears, the exactly opposite opinion is held. At least so intimates E. Wyllie Fenton, in a paper entitled "The Influence of Grazing on Vegetation," published in the Transactions and Proceedings of the Torquay Natural History Society (Vol. IV, Part IV, pp. 315–323, 1926). Torquay (tor-kee'), by the way, a place famous for the beauty of its situation and for its peculiar, almost subtropical climate and vegetation, is situated in southwestern England on the English Channel.

Mr. Fenton finds that "animals tend to graze those plants and those areas which are most rich in certain things such as phosphates and lime." He regards cattle as general grazers and "not very selective," horses as "rather selective" and on that account tending to "upset the balance of a pasture." Sheep, he says, "are close grazers and tend to leave the coarser vege tion." He finds that light grazing hurts the more val ble species the most, and that grasslands deterio under such use, but that when grazing is intensive, ot things being equal, "the useful and more nutritio grasses are favored (being more amenable to grazin spread, and tend to crush out the inferior types."

In the fields observed by Mr. Fenton the common grasses are creeping bent grass (*Agrostis* sp.), she fescue, and "Yorkshire fog" (*Holcus lanatus*). Cl grazing by rabbits caused noticeable improvement the stand of white clover. The number of spec decreased markedly in a field grazed by cattle, she and horses as compared with a similar field grazed cattle and horses only. In the first field the nati weed types survived only in isolated patches such would disappear entirely if the pasture were manur

Mr. Fenton states that where grazing has been ma more intense by the admission of a larger number stock "grasses of coarse tall growth have * * been replaced by a denser and much more nourishi herbage," and "in pastures which are not 'natur the success or failure depends very largely on the gr ing factor." With decreasing acidity, also, she fescue, cinquefoils (*Potentilla* spp.), and Aira cæspito decrease in frequency.

Red-Fir Tables for California

By Lester H. Reineke, United States Forest Service

Yield, Stand, and Volume Tables for Red Fir in alifornia, by Francis X. Schumacher, recently apared as Bulletin 456 of the University of California. hese tables for red fir (*Abies magnifica*) apply to evenzed second-growth stands that are normal, or fully cked. They are presented in standard form, using e index (height of dominant trees at 50 years) as the sis for site classification. Site indices range from 15 65 feet.

A valuable part of this bulletin is the presentation of and tables showing the distribution of tree sizes within ands of various ages and site indices. The detailed atistical analysis from which these tables resulted is idence of the care with which the work was done.

This bulletin should be of particular value, since little s been published heretofore concerning this species.

Forestry Survey of Great Britain

The British Forestry Commission has recently rerted on the most complete census yet made of ritish woodlands. Data were taken for the year 24. Six-inch ordnance survey maps, on which the reage and ownership of individual woodlands had en marked, were distributed through voluntary unty organizers to woodland owners, who were asked indicate on the maps the types and age classes of eir woods. In Scotland the information was rerded partly by the commission's local correspondents d partly by the technical staff.

The total woodland area of Great Britain was urned at 2,958,672 acres.[2] It was indicated that odlands occupy 5.1 per cent of the total land area England, 5 per cent in Wales, and 5.6 per cent in otland. The most heavily wooded counties in ngland, according to these returns, are Sussex, with per cent of its area in woodland; Surrey, with 12.3 r cent; Kent, with 11.1 per cent; and Hampshire, th 11.6 per cent. In Wales, Monmouth has 12.8 r cent of its area wooded, and in Scotland Nairn has per cent, Elgin 16.3 per cent, Kincardine 12.6 per nt, and Aberdeen 10.1 per cent.

High forest constitutes about half the woodland in ch of the three parts of the island, totaling 1,416,890 res. Coppice and coppice with standards total 8,680 acres; scrub, 330,703 acres; felled or devasted, 478,106 acres; and woods not available for the mmercial production of timber, 204,293 acres.

Broad-leaved species predominate in England, cofers in Scotland. The composition of the high forests, round thousands of acres, is as follows:

	England		Wales		Scotland		Great Britain	
	1,000 acres	Per cent	1,000 acres	Per cent	1,000 acres	Per cent	1,000 acres	Per cent
Conifers	195	25.9	17	41.5	510	78.1	672	47.4
Hardwood	338	44.9	14	38.9	73	11.1	443	31.3
Mixed	220	29.2	22	19.6	70	10.8	302	21.3

In concluding the report the forestry commission says:

> The economic or potentially productive woodlands are estimated to contain in all about 2,262 million cubic feet of timber and pit wood.
>
> The area cut over during and immediately after the war is estimated at rather less than 450,000 acres and the volume of timber felled at approximately 1,000 million cubic feet. This is equivalent to roughly one-third of the total volume standing in 1914.
>
> At the present time and in consequence of the war fellings, reserves of mature coniferous timber are very low and equivalent to not more than six months' consumption. The younger crops are on the same scale but are well distributed through the various age classes. The reserves of mature hardwoods (mainly oak), which were not drawn on to the same extent during the war, are considerable, although the average quality is not good. There is a great lack of young hardwood plantations. Oak planting in particular has gone out of fashion in favor of conifers. When the existing mature and semimature oak woods have disappeared, as they are steadily doing, the supply of home-grown oak will become negligible.
>
> There was distinct evidence in the woodland censuses of 1905 and 1913–14 that the total area of woodland was steadily diminishing. The average rate of planting from 1884 onwards had been about 12,000 acres per annum, which was roughly about 50 per cent of the rate required to maintain the nominal woodland area in a good state of productivity. The unprecedented war fellings swept away the bulk of the best coniferous timber, the best ash, and much good oak.
>
> As regards the future, it is certain that fellings will go on steadily to provide revenue and that private planting at best will do no more than replace current fellings. Further, landowners are less and less inclined to plant hardwood trees, such as oak, which are unremunerative to grow. At the same time a gradual degeneration may be looked for in the stocking of coppice-with-standards and coppice woods. It is unlikely, therefore, that the area of effectively productive woodland in private ownership will in the future exceed 1½ million acres, if indeed it reaches that figure. Any acreage over this figure which is deemed necessary for the welfare of the country will have to be planted by the State.

Together with this report the forestry commission has published its report on a census of the timber produced (felled) in Great Britain in the year ending September 30, 1924. This census, undertaken at the request of the Board of Trade as part of the general census of production for Great Britain for the year 1924, was carried out on a sample basis. Selected landowners were asked to make returns of the volume of timber and other wood felled on their property during the year, classifying it by types of woodland and by classes of material. Data were collected in this way for about 11.3 per cent of the total woodland area of Great Britain, and on this basis calculations were made for the whole country. Figures thus evolved for the total volume of timber and other wood felled in Great Britain during the year of the census are as follows:

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[2] The fact that this figure is 222,484 acres larger than that returned in 13–14 is explained by different and more intensive methods of survey the 1924 census, especially by the inclusion of "scrub."

	England		Wales		Scotland		Great Britain	
	1,000,000 cubic feet	Cubic feet per acre	1,000,000 cubic feet	Cubic feet per acre	1,000,000 cubic feet	Cubic feet per acre	1,000,000 cubic feet	Cubic feet per acre
High forest:								
Conifers	5.14	26.3	0.76	16.3	18.59	43.3	24.50	36.5
Hardwoods	10.01	29.6	1.66	37.7	1.09	17.8	12.76	28.8
Mixed	4.15	18.8	.85	38.4	1.06	18.0	6.06	20.1
Coppice and coppice with standards	8.11	16.7	.38	10.6	.07	8.2	8.55	16.2
Hedgerow timber	1.56	------	.12	------	.03	------	1.71	-----
Other	1.09	2.8	.03	.3	1.29	2.5	2.41	2.4
Total	30.06	18.4	3.80	15.0	22.13	20.6	55.99	18.9

The census of timber production covered the value of timber sold. Timber of sawmill size appears to have been sold at the average prices of 13d. per cubic foot for larch, 7d. for spruce, 6d. for Scotch pine, and 5d. for other conifers. The highest average price, according to the calculations, was 22d. paid for ash. Oak brought 18d., elm 10½d., beech 10d., and other hardwoods 10d.

The total number of persons permanently employed in British forests during the year ending September 30, 1924, is calculated to have been 19,220. The number of persons temporarily employed in the forests ranged during the year from 4,090 to 10,000.

(Forestry Commission, Great Britain: Report on Census of Woodlands and Census of Production of Home-Grown Timber, 1924. 68 pp. maps. His Majesty's Stationery Office, London, 1928.)

Growing Pine Pulpwood as a Farm Crop

The extension forester of Arkansas, W. K. Williams, has issued an extremely practical and helpful pamphlet entitled "Growing Pine Pulpwood as a Farm Crop." It contains information not only about farm-woods management but about methods of estimating and selling the crop, the growth to be expected from loblolly pine and stumpage prices, and shipping weights of pulpwood. The pamphlet also discusses the farm-woodland situation in southern Arkansas and includes a form for timber sale contracts. Most of its pages are filled with usable information, the kind that is of immediate value in actual practice.

Fiber Measurement in Norway Spru

A report by Dr. Elias Mork of the Norwegian For Experiment Station on his experiments in measuri fibers of Norway spruce (Granvirkets kvalitet sacr med sigte paa slip-og celluloseved, Papir-Journal Nos. 4–10, 1928) has been abstracted by Henry Baldwin as follows:

Mork defines summer wood as that part of the ann ring in which the cell wall between two lumina, mul plied by 2, is equal to or greater than the lumen, a spring wood as the section in which this quantity is le than the lumen. The proportion of summer wo varies according to the width of the annual ring. It greatest in narrow rings, in which it ranges up to 55 p cent. In medium broad rings it ranges between 10 a 25 per cent. Rings 7 millimeters wide have but half much summer wood as rings 1.3 millimeters wide, a fibers 20 per cent shorter. Fibers in the summer woo have thicker walls and smaller lumina, and are stronge denser, and longer than fibers in the spring woo Narrow rings, also, contain less parenchyma and fewe resin ducts than wide rings.

The length of the fibers varies not only with th width of the annual rings but with the distance fro the pith. Fibers are short near the pith (in Pice excelsa, 1 to 1.5 millimeters), increasing in lengt toward the bark, where they are often twice as long A more rapid increase of fiber length from pith t bark is found the farther up the tree one goes. Th longest fibers are found about 5 meters above th ground. Fibers in the root swelling are short.

Butt logs, having a smaller proportion of summe wood, shorter fibers, and lower density of fibers, are les valuable for pulp manufacture than wood from t center of the bole. Logs of small diameter, also, are les valuable, because they contain a greater proportion o pith.

Trees from good sites under otherwise equal conditions have longer fibers and a greater percentage o summer wood than trees from average sites.

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The New York Conservation Department recen issued a booklet entitled "Catskill Trails," by W. Mulholland, giving complete logs, with walking ti of the forest trails in the Catskills. An outline map colors is included.

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Announcements

Essay Prizes Offered by Society of American Foresters

Two prizes, of $1,000 and $250, respectively, are being offered by the Society of American Foresters in a forestry essay contest as the result of an anonymous gift for that purpose. The contest is open to anyone desiring to compete. Conditions are announced by the society as follows: "Essays submitted shall cover, first, the actual forestry situation in the United States to-day; second, a nation-wide remedy which (*a*) will, if applied, solve the problem of a permanent and sufficient supply of forest products and secure other benefits of forests essential to the public welfare; (*b*) will be applicable in actual practice; and (*c*) can be applied in time to meet the Nation's needs. The essays must be based not on hypothetical assumptions but on the actual situation in the United States to-day."

The essays must not exceed 3,000 words, exclusive of a summary of conclusions that should be presented at the beginning of the paper. They must be typed, and each should be signed with a pseudonym. A sealed envelope containing the author's real name and bearing the pseudonym on the outside should be transmitted with the essay.

The winning essays are to be published in the Journal of Forestry. Other essays submitted may be chosen by the committee of award for publication in the Journal. Essays not so published will be returned if the authors request their return and provide postage.

The committee reserves the right to withhold th prizes if no essays that are in their judgment worthy o the award are received.

Essays submitted should be forwarded, in time to b received not later than September 30, to either of th two members of the committee of award, namely, S. T Dana, School of Forestry and Conservation, Universit of Michigan, Ann Arbor, Mich., and Raphael Zon, Lak States Forest Experiment Station, University Farm St. Paul, Minn.

Forest Service Motion Pictures May be Purchased

Authority for the purchase of motion-picture films on forestry subjects prepared by the United States Forest Service may be obtained by addressing the De partment of Agriculture, Washington, D. C. The cost of the films is about $30 per reel of 1,000 feet. Persons or organizations purchasing films must agree not to make changes in the subject matter of the films. They must also agree to retain the department's credit line in the film and not to insert any commercial advertising matter. Lists and descriptions of the available films may be obtained by addressing the United States Forest Service, Washington, D. C.

During the second half of 1928, 28 Forest Service motion pictures were purchased by outside agencies.

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Because the free edition is necessarily limited, this periodical can be distributed without charge outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

FOREST WORKER

ashington, D. C. MARCH, 1929 Vol. 5, No. 2

State Forestry

States, Municipalities, and Counties Increase Forest and Park Holdings

uring the last three calendar years 1,755,658 acres and in the United States has been brought under te forest management. The total area of State sts now stands at 6,556,735 acres. The greatest ension effected in the 3-year period by a single te is the 1,200,000 acres reported by Washington. nsylvania has added 167,788 acres to its 1925 l, and Michigan is a close third with an increase 167,000 acres. Acreage added to the State forests other States is as follows:' Connecticut, 20,000; liana, 1,453; Louisiana, 3,700; Maryland, 5,247; ssachusetts, 12,000; Minnesota, 70,000; New mpshire, 8,605; New Jersey, 7,002; New York, 587; Ohio, 6,075; Texas, 62; Vermont, 1,729; West ginia, 227; Wisconsin, 3,000. In Idaho, 700,000 es listed in 1925 as State forest land is not so ssified in 1929.

At the end of 1928 State forests were reported by ee States that at the end of 1925 reported none—ware, Georgia, and South Carolina.

Three years' growth in the total of State park areas this country has added 98,834 acres to the 1925 ure, less 31,000 acres in Wisconsin no longer listed State park land. This makes the total 436,077 es. The acreage set aside for State park purposes ce 1925 is distributed as follows: Arkansas, 1,023; lifornia, 969; Connecticut, 1,000; Florida, 2,080; orgia, 10; Illinois, 878; Indiana, 570; Louisiana, 250; assachusetts, 2,000; Michigan, 17,255; Missouri, 55; Nebraska, 253; New York, 56,788; Oregon, 54; Rhode Island, 1,717; Vermont, 1,332.

In boosting the total area of municipal and county ests and parks from 697,447 acres at the end of 1925 726,577 acres at the end of 1928, the acreage devoted these purposes was increased in seven States and the strict of Columbia as follows: District of Columbia, 9; Illinois, 1,452; Maryland, 5,140; Massachusetts, 97; New York, 4,426; Ohio, 4,416; Rhode Island, 96; Vermont, 2,037. Connecticut reports 543 acres s under this classification on the latter than on the rmer date. Louisiana and Missouri, which reported forests in this category three years ago, now report 00 acres and 5,000 acres, respectively.

Areas of forest land owned by States and by municipalities and counties on January 1, 1929, as reported to the United States Forest Service by the individual States, are as follows:

State	Forest land owned by States			Municipal and county forests and parks	Total
	Forests	Parks	Other		
	Acres	*Acres*	*Acres*	*Acres*	*Acres*
Alabama			175,000	19,232	194,232
Arizona			41,255		41,255
Arkansas		1,023			1,023
California		13,814	50,000	7,640	71,454
Colorado			100,000	44,449	144,449
Connecticut	40,000	8,000	2,000	15,000	65,000
Delaware	50				50
District of Columbia				3,833	3,833
Florida		4,000			4,000
Georgia	166	10			176
Idaho		7,200	984,800	160	992,160
Illinois		2,098	[1] 6,000	32,030	40,128
Indiana	5,000	5,000	12,000		22,000
Iowa		7,000	5,000		12,000
Kansas		245		200	445
Kentucky	3,624		15,000		18,624
Louisiana	5,900	250	[1] 282,000	1,000	289,150
Maine	100	25	330,000	835	330,960
Maryland	9,082		6,986	19,910	35,978
Massachusetts	109,000	14,000	48,000	56,000	227,000
Michigan	500,000	25,000	782,000	3,495	1,310,495
Minnesota	420,000	38,279	580,000	7,635	1,045,914
Mississippi					
Missouri		35,155	46,000	5,000	86,155
Montana	566,000				566,000
Nebraska		1,000	500	14,000	15,500
Nevada					
New Hampshire	29,143		1,600	10,612	41,355
New Jersey	25,956	16,000	4,000	35,230	81,186
New Mexico			185,000		185,000
New York	2,107,328	140,000	15,500	175,000	2,437,828
North Carolina		1,724	[2] 85,600	37,257	124,581
North Dakota		250	17,300		17,550
Ohio	39,848	32,510	22,900	18,283	113,541
Oklahoma			[3] 27,300		27,300
Oregon		3,694	77,868	166,406	247,968
Pennsylvania	1,299,673	9,541	2,624	14,996	1,326,834
Rhode Island		1,717		2,500	4,217
South Carolina	967				967
South Dakota			[4] 80,000		80,000
Tennessee			98,110		98,110
Texas	5,694	550	50,000	1,500	57,744
Utah			66,000	1,710	67,710
Vermont	32,233	1,492	713	8,000	42,438
Virginia	588		1,500	9,700	11,788
Washington	1,240,763	6,500		14,964	1,262,227
West Virginia	15,620				15,620
Wisconsin	100,000	60,000	192,000		352,000
Wyoming			23,000		23,000
Total	6,556,735	436,077	4,417,556	726,557	12,136,945

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[1] Mostly marsh, game preserves, and shooting grounds.
[2] Including 77,000 acres of swamp land.
[3] Approximate.
[4] Described as "forest and park" land.

Oregon's New Forest Taxation Law

The forest taxation law enacted in February, 1929, by the State of Oregon is outstanding in that it provides for systematic and immediate classification of forest lands on a statewide basis and without dependence on special contracts between the State and the landowners.

For application to lands which are better suited for forest production than for any other use, and on which the forest crop or crops are not mature in merchantable quantities, this law sets up a 5 cents per acre annual fee and a 12½ per cent yield tax in lieu of all ad valorem property taxes. Under this law it becomes the duty of the State board of forestry to prepare lists of lands that in the judgment of the board may be classified as reforestation lands and to forward these lists to county assessors. Hearings on the proposed classification are to be held by the board at county court houses. Having reconsidered its classification in the light of testimony brought out at these hearings the board is to send its recommendations, with records of the hearings, to the State tax commission, which will finally determine the classification. Appeal from decisions of the board or the commission may be taken to circuit court. On or before October 1 of each year the board is to determine what lands not yet classified as reforestation lands should be so classified. Further proposals of the board for placing land under this classification are to be acted upon according to the procedure just described. Periodically, also, the board is to ascertain whether lands so classified are being protected as provided by law and are being used primarily for forest crop production. Any cases in which the findings are negative are to be presented to the State tax commission, which may "declassify" the lands in question. Owners of "declassified" lands will be required to pay the difference between the tax actually paid and the ad valorem tax for any period for which the latter should rightfully have been collected, under the same provisions as to payment of interest, penalty, and cost charges as apply to delinquent ad valorem taxes. The forest fee is to become a lien against premises on March 1 of each year, likewise under these provisions.

The act does not affect the application of ad valorem property tax laws to buildings, improvements, water and power rights, or any values other than forest values on lands taxed under its provisions.

No land that was valued and assessed for its forest growth on the 1928 tax rolls of the State is to be classed as "reforestation land" except with the approval of the county court or after the harvesting of the forest growth.

Before removing any forest crop from reforestation land the owner must obtain a written permit from the State board of forestry. Unit value of the crop is to be set by the board, subject to appeal to hearing before the board and from the action of the board to the circuit court. In the absence of full assurance to the financial responsibility of the permittee, t board is to require a bond indemnifying the Sta against any loss of yield tax revenue.

The number and kind of units of forest produc harvested are to be reported by landowners und oath to the State board of forestry and, with the rem tance of the yield tax, to the county tax collector, r ports covering 6-month periods and being made the first 15 days of January and the first 15 days of Jul

All forest fees and yield taxes are to go to the coun treasurer and be apportioned to the various taxi districts.

Authority is given to the State board of forestry make orders, rules, and regulations necessary to car out the purposes of the act.

The act provides, in addition, that on and aft July 1, 1933, landowners desiring to enter into agreement with the State to use lands for the growi and development of forest crops may do so, in cases which in the judgment of the State board of forest such an agreement will substantially accomplish t purposes of the act. The agreement will bind the lan owner and his heirs and assigns to use the land f growing forest crops for a definite period not exceedi the board's estimate of the time necessary to matu the forest crop growing or to be grown on the land, a during the life of the agreement the land will be taxe as reforestation land as provided in the act. Any suc agreement may be canceled by the board on 30 day notice upon failure of the owner to comply with t terms and conditions of the agreement or with the fo est laws of the State as these affect the lands covere by the agreement; or the agreement may be cancele renewed, or transferred by mutual consent of the boa and the landowner, if it is the judgment of the bo that such action will in no way defeat the purposes the act and if the State is protected against loss.

Members and authorized representatives of the Sta tax commission and the State board of forestry a authorized at any time to go upon any of the lan classified as reforestation lands. The board of forest is authorized, also, to examine or cause to be examine any records bearing on the correctness of reports ma in pursuance of the act.

The act provides that any person shall on request granted a hearing before the board of forestry on a subject pertaining to activities of the board under t act affecting his property or interests as a taxpaye and that any person affected by any decision of t board or the tax commission under the act may appe from the decision, within 60 days, to the circuit cou of the county in which land affected by the decision located.

For failure to obtain a permit before cutting or remit yield taxes within the periods appointed, t law sets the penalty of an additional yield tax of 1 r cent. This tax, with the 12½ per cent yield tax, ll be a first lien against forest crops, collectible by it of attachment with interest at 10 per cent. Falsi- ation of returns or representations made under the ovisions of the act is punishable by a fine of from 00 to $1,000 or imprisonment for from 30 days to year, or both, the offender being still responsible for yment of any amount due under the act. Harvest- g of forest crops from classified lands without permit made a misdemeanor punishable by a fine of not ore than $1,000 or imprisonment in the county jail r not more than 6 months, or both.

Michigan's First Municipal Forest

By Harold Titus, Michigan Conservation Commission

Traverse City, Mich., points with pride to its unicipal forest as the first established within the ate; and those of its citizens who have been most tive in initiating the improvement feel that they ve a very unusual combination of timber growing, me protection, and general recreational advantages.

The tract under administration is of approximately 00 acres, surrounding a municipal hydroelectric ant on the Boardman River. In 1924, its soil and ver conditions ranged all the way from excellently ocked swamp hardwood types to lean, badly burned, but bald upland sand plains. In that year the ea was constituted a game refuge under a State atute and was posted against the guns. The following ring the city commission, working with local sports- en, called on the State department of conservation advice as to what to do to improve the cover where provement was obviously needed.

Marcus Schaaf, State forester, made a reconnaissance he tract and laid out a planting program which, lowed for three years, covered the areas that needed lp in establishing a stand. At a planting "bee" e first spring 6,000 white pines were planted; in is nearly 200 men and women took part, and just many different and personal interests in the project re awakened. The next year saw 35,000 white, k, and Norway pine seedlings go into the ground, d the final planting was of 25,000 jack and Norway. ese larger plantings were done partly by volunteers d partly by the city light and power department's nstruction crew. The resultant stands range from r to excellent.

The State department of conservation has thrown a e line around the boundaries of the project and aintains the line—which, fortunately, is in a strategic cation in relationship to a considerable block of open untry that needs special protection. Fire tools are pt at the power plant and during the fire season the act is under constant observation from one of the ate's lookout towers, which is located within a mile the boundary.

While this Traverse City forest is small, its tree population is remarkable for variety of species and for wide range of age. Some forties are splendidly stocked with Norway pine that is already of merchantable size; islands of seed-producing white pines are scattered here and there; and in several places dense and relatively extensive stands of uniform young jacks are growing lustily.

Deer frequent the place, ruffed grouse and woodcock are abundant, and black duck annually nest in the quiet waters at the head of the pond. The Boardman River is an outstanding trout stream, and fishing has not been prohibited within the forest boundaries. In 1927 beaver were reintroduced, the animal having been extinct in the vicinity for a quarter of a century; they have established themselves within the sanctuary and apparently are having the time of their lives.

This forest is 14 miles from the city that owns it, and the roads leading to it are none too good. Nevertheless, because it presents such an impressive range of native trees and such an abundance of native animal and bird life it is constantly growing in popularity with the community and with summer tourists.

New York Acquires New Demonstration Forest

A recently completed purchase makes New York State the owner of a tract of 4,250 acres of land in Oswego County well adapted to its intended use as a demonstration forest and game refuge. This land, formerly the property of the Cleveland estate, of Watertown, N. Y., is bounded on the north by the Oswego-Jefferson county line, and is in compact form. Except for about 100 acres of old clearing it is entirely covered with an excellent stand of second-growth timber of both broad-leaved and coniferous species. The merchantable timber is estimated to average about 3 cords per acre. The entire area is within the range of the Castor Hill State fire-observation station.

New York Builds Repair Shop for Fire Equipment

At Saranac Inn, N. Y., the State conservation department has built a storehouse and repair shop where all its fire-fighting equipment can be overhauled and repaired. Combined with the shop is a dormitory accommodating 12 men. The 58 high-pressure fire pumps belonging to the department were all sent to the shop for overhauling and repair during the present season. In December and January nine rangers from other sections of the State were detailed to the shop to assist in the repair work. Other work to be carried on during the winter months by men stationed at the shop includes the construction of equipment to be placed at public camp sites and the pruning and thinning of forest plantations.

Two Proposed Forestry Laws for New York

As an outgrowth of investigations by the temporary reforestation commission created in 1928 by the New York Legislature two bills have been introduced in the legislature by Senator Hewitt. One of these would amend the conservation law so that lands outside of the forest-preserve counties might be acquired by the State for forestation, by purchase or gift. The minimum area for each tract acquired under this amendment would be 500 acres. The land would be chosen on the basis of suitability for the establishment and maintenance of forests, the growth of timber and other forest products, and recreation and kindred purposes. It would be perpetually devoted to the planting and growth of trees, plantations established on it being managed and protected under the direction of the conservation commissioner. The land would be exempt from State and county taxes, and for purposes of all other taxes would be assessed at not more than the price paid for it by the State or, if it was acquired by gift, at its valuation for forestation purposes, but not at more than the value fixed upon the town assessment rolls two years prior to the gift. The bill carries an appropriation of $115,000, of which sum $15,000 would be made available for the purchase of equipment for tree nurseries owned and operated by the State.

The second bill relates to the establishment of county forests. Under its provisions each board of county supervisors would be empowered to appropriate funds for the establishment of county forests, without giving public notice, and to raise money for this purpose by a tax on real and personal property. In each case in which the proposed forestation plan of a county and its prior expenditures for forestation purposes met with the approval of the conservation commissioner, an amount not to exceed $5,000 a year would be contributed by the State toward the carrying out of the plan. In addition, the State would supply trees for planting. The plan might be either the purchase, forestation, and care of land suitable for the purposes of watershed protection, the production of timber and other forest products, and recreation and kindred purposes, or the forestation and care of land of this description already owned by the county.

The title to lands acquired under the provisions of this measure would be vested in the county, and the lands would be perpetually devoted to forestry purposes. The lands would be exempt from State and county taxes, and for the purpose of all other taxes would be assessed on the same basis as lands acquired by the State under the provisions of the bill just described.

The size of tracts purchased for county forests under the provisions of this bill would be limited to less than 500 acres, except in counties within the forest preserve.

Northern Wisconsin Counties Favo County Forests

In the fall election of 1928 voters of Lang County, in northern Wisconsin, voted 2 to 1 in fav establishing county forests. Through tax delinque the county owns thousands of acres of cut-over la much of which Extension Forester Wilson finds t well stocked with valuable young growth. The en county is included in the recently established State protection district No. 9. It was explained to voters that if county forests were established t would probably be placed under the administratio the county agricultural agent, and that practically expense would be incurred by the county in un taking the project as contemplated other than the of placing signs at the boundaries of county forest order to prevent trespassing.

Representatives of 16 northern Wisconsin coun met at Rhinelander in December to discuss the de quent-land problem. This conference requested legislature to amend existing law so that counties get clear title under tax deed in less time than the or more years now required, and so that counties list their land without paying the tax of 10 cents acre that is paid by private owners. It also reques that the legislature make forestry more attractive private owners by reducing the tax from 10 cents t cents, and that it enable counties to zone land forestry and to discourage attempts at agricultu settlement within forestry zones.

Arkansas Forestry Bill Defeated

The Arkansas House of Representatives on Februa 18 rejected the bill proposed by Representative E. McFerrin to create a State forestry commiss establish a State forest nursery, and provide penalt for negligently starting forest fires. The vote was to 11. Mr. McFerrin has introduced a new bill lacki some of the controversial features of the defeated b

State Forester Proposed for Nevada

A bill introduced in the Nevada Legislature propos the creation of the office of State forester. The or appropriation asked is $200 to cover field and off expenses, the plan being to place the forestry dut with some State department already organized. T bill would authorize county commissioners to p ordinances for the prevention of forest fire.

* * *

The standard of forest fire protection for the Sta of Minnesota, Michigan, and Wisconsin recently cided upon by the fire chiefs of those States is the limi tion of each year's fires to one-fourth of 1 per cent the total area under protection.

Timber Untouched by Fire Brings Better Prices

A 45-acre woodland at Sulligent, Ala., belonging to . A. Eastman has been protected from fire for 41 years ith negligible expense, the State forestry commission cords. Eight years ago Mr. Eastman sold from the rea practically all the timber more than 12 inches in iameter. Because the pine timber was almost entirely ee from hollow butts, cat faces, pitch seams, heart ot, and other defects usually originating in fire wounds, he stumpage price per 1,000 feet was $1.50 more than hat of other pine cut in the locality. The oaks were ewed into crossties, and since almost every tree was ound the cutters averaged from one to three more ties er day than they had in any other woodland in the ommunity. Another fairly good crop of timber could e cut from the land now.

More Fire Protection for Minnesota

Minnesota purchased 32 new lookout towers in 1928. hree construction crews were employed throughout he fall in erecting towers.

In each of two forest-protection districts of Minneota a fire-fighting crew of eight men was kept on call uring the six or eight weeks of greatest fire danger in 928. Each man received a daily retainer of $1 and as paid 35 cents an hour for time spent in fighting res. A salaried man was kept on duty as driver of he fire truck. The system worked out so well that it ppears to deserve extension to other districts. In one nstance a crew assembled and started for a fire in 8 ninutes.

New Forest Protective Association Organized in Connecticut

The Housatonic Forest Protective Association has een organized by owners of land in Norfolk, Canaan, alisbury, Cornwall, and Sharon, Conn. Approxinately 11,000 acres of land are to be protected by he new association, which is the sixth of its kind rganized in the State. Together the six protective ssociations control more than 66,000 acres of privately wned woodland in western Connecticut. Members f the association assess themselves 4 cents per acre er year and the State matches the members' conributions. Hon. John Calhoun, of Cornwall, has een elected chairman of the new association, and . W. Krause, Canaan, is its secretary and treasurer. . W. Brooks, Torrington, has been employed as atrolman.

* * *

The tenth steel observation tower of the Connecticut epartment of Forestry was recently completed in the own of Oxford.

California Fire Record for 1928

Careless smokers were held responsible for about half the 2,660 fires reported in 1928 on areas of California patrolled by the State government. After the 1,160 fires traced directly to this cause the next largest group was the 401 traced to brush burners. The remainder of the list given out by State Forester Pratt is: Incendiary, 362; railroads, 103; lumbering, 100; campers, 83; lightning, 66; miscellaneous and unclassified, 385.

Charges brought by representatives of the forestry board and cooperating agencies resulted during the year in 233 convictions of violation of the State fire laws, and 53 cases were settled out of court. Penalties imposed included 31 jail sentences and fines amounting to $5,048.50.

Three New Protection Districts in Wisconsin

The establishment of 3 new forest-protection districts in Wisconsin in 1928 brought the total number of such districts to 11. The protection system now covers substantially all parts of the State that are thought to need protection. Each district has a headquarters building that is a combined office and storehouse.

Out of an estimated requirement of from 100 to 125 fire towers Wisconsin now has 75, of which 21 were built in 1928. All the towers erected in that year have glass-inclosed tops.

* * *

Four forest-protection units were organized by the Texas Forest Service in 1928 in cooperation with the Houston County Timber Co., the Southern Pine Lumber Co., the Temple Lumber Co., and the Gilmer Co. Together they embrace 395,000 acres of company land.

The number of lumbering fires in Texas was 28 per cent less in 1928 than in 1927.

* * *

A special forestry division has been established by the Alabama Commission of Forestry, comprising the counties of Mobile, Baldwin, and Escambia. Forest Inspector Harry F. Smith, formerly stationed at Union Springs, was assigned to the new division. In cooperation with local forestry agents and patrolmen Inspector Smith will make a survey of the section with the view of determining how its heavy losses from forest fires may be reduced.

* * *

Seven 80-foot steel lookout towers were erected in 1928 by the Pennsylvania Department of Forests and Waters.

Classification of Minnesota State Lands

Setting aside of 541,048 acres of State land in 53 townships in northern Minnesota as State forests is recommended by Commissioner of Forestry and Fire Prevention G. M. Conzet in a report to the legislature on "State Lands, Their Agricultural and Forest Possibilities." State forests already established in Minnesota contain 388,000 acres. This report is the result of a classification of State lands carried out by the commissioner in accordance with a measure passed by the legislature in 1927. Other recommendations contained in the report call for the consolidation of State forest lands by acquisition or exchange; more intensive fire protection for these lands; the adoption of a planting program and the establishment of a State nursery; provision for research, timber sales, and management plans; an economic survey and land classification; and the payment by the State of a tax on lands set aside as State forests.

Not all of the 541,048 acres recommended for State forests is classified as permanent forest land. Out of 311,408 acres examined 13,200 acres is classed as suitable for agriculture but not needed for farming at present; and 98,909 acres is classified as submarginal even for timber production. The latter total includes natural grass meadows, open muskeg, barren highland, and areas that support only a dwarfed, stagnant growth of trees. Most of these nonproductive areas have a value for game production or as natural water reservoirs and for that reason are recommended for inclusion in State forests.

Little of the State land examined has been burned over, largely because of the great proportion of swamp and the fact that most of the highlands are islands surrounded by swamp.

Out of 212,499 acres of timber-producing land examined 43 per cent is virgin and 57 per cent has been cut over. On some of the cut-over land there is merchantable timber (second growth or trees reserved by the State when the area was logged); on most of it, however, reproduction is not satisfactory either in density or in species. Although the State timber is scattered and much of it is slow growing, it is generally in good condition and is not deteriorating, so that there is no hurry to dispose of it.

The survey brought out the fact that the State owns a good deal of land poor for agriculture and unsuited even for timber growing. The estimates of timber stand are lower than any previous estimates of timber on Minnesota State lands. The report advocates the acquisition by the State of good forest land to offset its poor land.

The total area of State land in Minnesota is 1,943,235 acres. If the estimate resulting from this study, that the timber stand on the lands examined averages 924 board feet per acre, is applicable to the total area of the State's lands, the standing timber on State lan aggregates about 1,795,549,000 board feet.

As a result of the survey, maps were prepare showing the economic status of land, timber types, an surface indications of soil conditions in five groups townships in which examinations were made. Two pr liminary management plans were also prepared.

Two Timbered Tracts Purchased by Illinois

By a recent purchase, two timbered tracts in Ale ander County, Ill., became the property of the Stat One of these is included in the 3,000 acres of land an water at Horseshoe Lake, near Olive Branch, whic the State will develop as a game and fish preserv About 300 acres of the Horseshoe Lake property is forest, containing some excellent timber. The secon area included in the purchase is a 400-acre tract hilly timberland about 6 or 8 miles north of Hors shoe Lake. This property has been pretty thoroughl cut over in recent years and has suffered at variou times both from trespassing and from fire. Still contains some merchantable timber and on the who is well stocked with young trees, including some oak red and black gum, yellow poplar, maple, and beec The game commission intends to use this tract fo game purposes, perhaps for experiments in raisin quail. In the meanwhile Chief Forester Miller ha taken steps to protect it from fire and to demonstra firebreak construction to the owners of the neighborin property, most of which is forest land. A fire lin nearly four furrows wide has been formed around th property with the use of a tractor and a heavy breakin plow. The fire line has been built to follow the mai ridges surrounding the watershed of a stream th drains the property, although at several points th meant carrying it outside the property line. The cos for labor and supervision was about $112. It planned to arrange for a local resident to act as guar during the fire season, remunerating him with the us of the 75 acres or so of cleared land included in th tract and with a small monthly fee.

Essex County, N. Y., Acquires its Second Forest

Essex County, N. Y., has acquired another count forest by purchasing 516½ acres of the John E. Mi holland estate in the town of Lewis. This land located about 3 miles north of Elizabethtown at th junction of the main highway to Montreal and th road to Lake Champlain. It lies in what the Stat conservation department classes as the best whit pine territory in New York. Planting will be begu this year, with the expectation that it will be com pleted in 1930.

ook Forest in Pennsylvania Becomes Property of the State

The Cook Forest, in Forest, Clarion, and Jefferson ounties, Pa., has become the property of the State, ennsylvania citizens having subscribed the $200,000 eded to complement the $450,000 appropriated for s purchase by the legislature. This forest of 7,219 res contains more than 500 acres of old-growth mber, the largest existing remnant of the original rests of the State. It is to be used as a State forest rk.

Blister Rust Control Work in New Hampshire

Although spring came late last year and the early ummer season was unusually rainy, New Hampshire lister rust control forces contrived to cover even more round in 1928 than in 1927. Initial work in the radication of Ribes was carried out on 145,329 acres f land, and reexamination on 82,201 acres. Toward e cost of this work $26,300 was made available by 5 towns; $2,400 by 4 cities; and nearly $6,000 by 37 dividuals, associations, and lumber companies. The st per acre averaged 17.8 cents.

Better Fire Record for Louisiana Protected Area

Ninety-nine out of every hundred acres protected y the Louisiana Division of Forestry escaped burning the 6-month period ending December 31, 1928, hich was the most successful half year thus far corded by the division. On similar lands in the ate not under protection fires covered from 10 to 50 cres in each 100, State Forester Hine reports. For e protected area the total number of fires was 795 nd the total area burned was 47,859 acres.

* * *

Two steel observation towers were erected in Mary- nd in 1928, one 93 feet high at Brandywine, Prince eorge County, and one 120 feet high at Millville, orcester County.

* * *

During 1928 Ohio purchased 4,426 acres of forest nd, 3,930 acres for State forest and 496 acres for tate forest. park purposes. The average cost per cre was $8.10.

* * *

An increase of 899 acres in the area of State forest nd in New Jersey between October 1, 1928, and Jan- ary 1, 1929, brought the total to 25,956 acres.

Higgins Lake Nursery Furnishes 12,000 Young Trees

Trees taken from the Higgins Lake nursery of the Michigan Department of Conservation in 1928 totaled 12,894,400. Of this number 11,626,600 were planted on the State forests and 1,267,800 were distributed to private planters. The acreage planted was 14,295, distributed as follows: State forests, 13,027; other State lands, 148; municipalities, 95; water and power companies, 112; organizations, associations, and clubs, 73; farmers, 420; others, 420.

The trees were white, Norway, and jack pine, which are the only species raised in this nursery.

Idaho Guide for Tree Planters

A convenient 2-page guide for tree planters was issued last fall by the School of Forestry, University of Idaho, in connection with its announcement as to the planting stock available for distribution from the State forest nursery. One table classifies the 29 available species according to drought resistance, requirement of special care, and desirability for farm woodland, shelter belt or windbreak, ornamental, roadside, or shade purposes, and a second table indicates for each of the 44 counties of the State which of the species are best adapted to local conditions.

* * *

The 1928 crop of the Alabama State forest nursery was distributed to 216 landowners in 31 counties. This distribution reached 14 more counties than that of the preceding year. Longleaf pine was by far the most popular species, with black walnut and catalpa next in rank.

* * *

Several pounds of persimmon and ash seed from Wake and other counties in the eastern part of North Carolina have been forwarded by State Forester Holmes to Russia for experimental planting, at the request of the forester of Torgavitza, Uman County, Russia.

* * *

Four additional tracts in North Carolina have been authorized by the State board of conservation and development as game refuges and auxiliaries. One of 1,000 acres is a part of the Fort Bragg Military Reservation, and one of equal size is included in the property of the Tallahassee Power Co. Others are situated in Vance Township, Lenoir County, and on holdings of the University of Chicago in Carteret County. Game reserves under the administration of the State now number 12.

Education and Extension

Pack Gives Yale $200,000 for Applied Forestry Studies

A foundation for the advancement of applied forestry has been established at Yale University, through a gift of more than $200,000 by Charles Lathrop Pack. The purpose of this endowment is to advance the knowledge and practice of forestry in the United States through field investigations and experiments and through the development of examples of applied forestry.

The first piece of work to be financed by this foundation will be a study conducted by Henry S. Graves, dean of the Yale Forest School, to determine how an educational institution like Yale may contribute to the progress of forestry through experimental and demonstration forests and in other ways.

Yale owns or controls a number of forest tracts in Connecticut and New Hampshire that are being used for instruction and research and for the demonstration of forestry practice. These forests, Dean Graves points out, are well adapted to the work contemplated in establishing the Charles Lathrop Pack Forestry Foundation, and will be greatly enhanced in value by this work.

A previous gift by Mr. Pack enabled Yale to enlarge its forest property at Keene, N. H. In past years, also, Mr. Pack has given funds for the establishment of demonstration forests to the New York State College of Forestry and the College of Forestry of the University of Washington.

National Research Fellowships in Agriculture and Forestry

A number of fellowships in the fields of agriculture and forestry are being established by the Board of National Research Fellowships in the Biological Sciences. The fellowships are intended not for the support of work in the more specifically applied phases of agriculture and forestry but for the development of men planning to work in the fundamental aspects of these subjects. They are intended primarily for relatively recent graduates and not for those already professionally established, and are open to citizens of both sexes of the United States and Canada who possess a Ph. D. degree or its equivalent. The appointments are for full time, and fellows are not permitted to engage in any other remunerative or routine work. The choice of a place to work is left the fellow, subject to the approval of the fellowsl board.

The basic annual stipends are $1,800 for unmarri fellows and $2,300 for married fellows in Ameri or $1,440 and $2,184, respectively, with additio travel allowance for fellows appointed to study Europe. Awards are made for one year, but fello ships may be renewed.

It was asked that persons wishing to be consider for appointment to these fellowships for 1929–30 f their applications with the Board of National Researc Fellowships in the Biological Sciences at the hea quarters of the National Research Council in Washington, D. C., by April 1. The final choice of fellov is to be made by the board at a meeting on April 25–2

Three Cornell Fellowships—Nature Education, Forestry, and Diseases o Ornamentals

Through a gift of the Charles Lathrop Pack Forestr Trust, Cornell University is enabled to spend $3,000 year in each of the two school years 1928–29 and 1929–30 in maintaining two or more fellows studying problems of nature education and forestry. The purpose c the investigations is to determine methods and practices affecting the education of the public in the use natural resources.

The Armstrong fellowship, established in Cornell b the Armstrong Tree Service (Ltd.) for a period o two years beginning June 1, 1928, carries an annua grant of $1,250 and has as its purpose the investigatio of diseases of shade and ornamental trees.

Woodsmen's Short Course Repeated by Wisconsin

The woodsmen's short course given by the University of Wisconsin in the fall of 1927 has been repeated in the present school year, with principal emphasis on commercial planting. Field instruction was given on the land of the Nekoosa-Edwards Paper Co., where commercial planting by means of tractors was demonstrated. Among the students were several logging superintendents of companies planning to undertake selective logging.

Forestry Course at North Carolina Agricultural College

he North Carolina State College of Agriculture and ineering, Raleigh, N. C., is organizing a division of stry headed by J. V. Hofmann, formerly professor orestry at the Pennsylvania State Forest School. general course in forestry was offered for the second of the present school year. The school has a forest bout 1,500 acres near Raleigh, including one piece ntouched shortleaf pine and oak.

ricultural College Supplies Planting Stock for Northern Michigan

t the Dunbar Experiment Station, near Sault Ste. rie, the Michigan Agricultural College has been eloping a forest nursery, beginning in 1926. A ion seedlings are now on hand, which will be used to ply planters in the upper peninsula and in the reme northern part of the lower peninsula. The nbar station comprises 570 acres, nearly all wooded. s being used by Professor Chittenden, head of the estry department of the college, for field work as well for silvicultural experiments.

Occupations of California Forestry Graduates

Of the 127 graduates of the University of California ssed by the university's forestry alumni society as esters (this number includes 14 men who did not jor in forestry and 1 deceased) only 32 are now gaged in work unrelated to forestry. More than fourth of the total are employed by the United tes Forest Service, 25 in forestry and 9 in grazing rk. Other public employ is reported for 12 of the n engaged in forestry or related work, private ploy for 9, and teaching for 4. Lumbering has imed 28 of the group, entomology and pathology 6. ere are 2 engaged in grazing work outside the Federal rvice.

Master's degrees have been won by 34 of the men and Ph. D. by 1. Of the master's degrees 26 were con-rred by the University of California.

Nearly two-thirds of the group, 81 men, are living in lifornia; 36 are elsewhere in the United States and aska; and 9 are in foreign countries.

California Ph. D. in Forestry

The forestry department of the University of Cali-rnia now has equal status with all other departments the university in respect to opportunity for work ward the Ph. D. degree. A recent decision of the ademic senate of the university removes restrictions to the departments in which the work of a candidate r the degree may be centered.

First Sophomore Forestry Camp of the University of Michigan

The first sophomore summer camp of the School of Forestry and Conservation, University of Michigan, will open on June 24 in temporary quarters at a lumber camp of the Cleveland-Cliffs Iron Co. in Alger County, Mich., about 10 miles west of Munising. Robert Craig, jr., will direct the camp and Shirley W. Allen will be an instructor. The students will measure logs, individual trees, and stands of timber, will study growth and yield, and will have practice in fire prevention and suppression and in the construction of forest improvements. The location of the camp will permit frequent excursions to woodworking industries. Near the camp site are stands of virgin timber and logging operations. The students will be in the woods until the middle of August.

Half of Cornell's Forestry Graduates Stick to Forestry

Half the men holding forestry degrees conferred by Cornell University in the period 1911–1928, inclusive, have remained in the forestry profession, according to a survey made by Prof. C. H. Guise. In September, 1928, Professor Guise found, 112 of the university's 222 living forestry graduates were engaged in forestry. Of these practicing foresters 58, or more than half, were in private employ; 27 were in Federal and 10 in State employ; 7 were teaching; 6 were engaged in graduate study; and 4 were abroad. Out of 54 men who had received the M. F. degree from Cornell, 39 were still in forestry. The latter group included 14 in private and 18 in Federal and State employ, 4 teachers, and 3 men in foreign countries.

Men specializing in forestry made up only half the total number of students—246—who registered for regular forestry courses at Cornell University in the year 1927–28. For that year, also, the forestry department reports 19 registrations in the summer school by men who were not candidates for forestry degrees, 28 in the summer camp, and 6 in the short winter course.

Idaho Puts on Forestry Education Campaign

A forestry educational campaign was made in Idaho last summer by the State chamber of commerce, the forestry associations, and the State board of publicity in cooperation with the United States Forest Service. Four reels of film were specially prepared. The Forest Service provided a truck outfitted with motion-picture apparatus, and a man to drive the truck and operate the projection machine. The cooperators provided as lecturer State Senator John D. Robertson. In the 76 towns where meetings were held the attendance averaged 435. The tour was given favorable notice by 58 newspapers in the State.

Education for Fire Prevention Pays

The forest-protection dollar goes much farther when a good proportion of it is spent in educating the public to prevent fires, according to the results of the fire-prevention experiment recently concluded on Cape Cod. In the six townships that were the scene of the experiment the total cost of forest-fire suppression in the 3-year period ending with 1925 was $29,487; during the three years of the experiment, 1926–1928, activities for public education, patrol by fire-prevention agents, and suppression all together cost but $23,551, or 20 per cent less. For the three years preceding the experiment the total area burned over was 28,089 acres; for the period of the experiment it was 5,885 acres, a reduction of 79 per cent. In other words, with the use of one-fifth less money the fire losses were reduced by four-fifths.

Boy Scouts "Know Their Stuff" and Practice It

The council for the southeast district of New Mexico, Boy Scouts of America, has been given permission to maintain a scout camp in Potato Canyon, Lincoln National Forest. To make the camp accessible a road approximately 4 miles in length has been built. This road is of particular value to the Government in that it gives access to an area of relatively high fire risk. Cabins to accommodate 300 boys have been built, with mess hall, assembly hall, workshop, office, and hospital. The boys are given instruction in hygiene, and during the past year in camp they have had no use for the last-mentioned building except as a guest house. The boys have built 4 miles of telephone line.

Ranger R. I. Boone, in charge of the Weed Ranger District, gives the boys training in the prevention, detection, and suppression of forest fires. The boys now propose to build a lookout tower on Potato Peak and man it during their stay in the woods.

Ranger Boone says:

> With 300 boys in the woods during the past fire season not a single forest fire was started. Some of the boys went on a hike of several days to the Sacramento River, cooking their meals on open fires, but every fire was taken care of before they left it. Turn 300 men loose in the woods and get gray. The boys know their stuff and practice it.

Texas Reports Successful Fire Prevention Campaign

In 1928 a motion-picture operator and lecturer employed by the Texas Forest Service served continuously from June till the end of the year, giving 165 shows before a total attendance of 23,710 people in the forest fire protection area. The field force of the service posted 23,642 fire-warning notices. Forest patrolmen made 982 school visits, giving talks to 58,422 pupils. More than 86,000 pieces of printed matter on forest-fire prevention were distributed to chil and adults, and 19,646 adults were interviewed re ing care with fire in the woods.

For 1928 the Texas forestry organization repo gain of 61 per cent over 1927 in the number of far stockmen, and others, not including railroad or lu employees, who voluntarily gave assistance in fig forest fires.

Tree Planting Campaign at Dallas, T

Prizes totaling $175 were offered in a tree-pla campaign conducted in Dallas, Tex., this winter u the auspices of the civic art committee of the city commission of Dallas. Miss Jeannette K. Rippe $25 offered for the best slogan to be used during campaign, with the slogan—

Plant trees to-day—
Inherit beauty to-morrow.

First and second prizes of $50 and $25, repsecti were offered to the parent-teacher associations b ing about the planting of the largest numbers of s trees; a prize of $25 to the child obtaining the lar number of orders for trees; and first, second, and t prizes of $25, $15, and $10 to organizations for win displays in Oak Cliff showing the importance of planting.

Pupils in Rural Schools Plant Black Walnut

A project undertaken by children in rural school Rowan County, N. C., under the supervision of Cou Agent Yeager, calls for the planting of a black wal grove on each of the farms from which the chil come. Many schools in the county have already a 100 per cent report. In addition, the children collecting the best black walnuts they can find entering them in exhibits at each local school. Se tions from these exhibits will be entered in a cou wide show, and the nuts finally selected as best will used in planting black walnut trees as a Four-H C project on each of the 60 or more rural school grou in the county.

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The Mississippi Forest Service last fall sent ev public school superintendent and principal in State an outline of suggested correlations betw forest study and nature study, geography, agricult community civics, science of home and communi biology, elementary economics, and English. T folder presenting this outline gave also a list of mate suitable for use in making these correlations t could be obtained from the State forester and t United States Forest Service. The folder was p forated so that the list of material could convenien be detached for mailing when the teacher had check the items desired.

uisiana Schools Plant More Trees on Arbor Day

he steadily growing popularity of Arbor Day in isiana was demonstrated this year by orders from ools for more than 15,000 State nursery trees. s was twice as many trees as the nursery had ever re provided for Arbor Day plantings. The largest ments were made to schools in and around Lafay- , St. Martinsville, Breaux Bridge, and New Iberia. ch wild stock, as well as the stock from the nur- , was planted by schools on Arbor Day, which was brated on February 8; and thousands of trees in ition to those for Arbor Day planting were sup- d by the State forester for school forest planting ing the recent season.

restry Lectures and Motion Picture Shows Given Before Thousands in the South

By the end of 1928, 900 lectures and motion-picture wings had been given in schools of Florida, Georgia, l Mississippi by the staff of the forestry educational ject in which the governments of those States are perating with the American Forestry Association. e audiences at the school meetings totaled 120,000, l included 70,000 school children. In addition 000 people were reached through programs given at nty fairs. The five trucks that carry the lecturers l their motion-picture outfits and exhibits from ce to place have an average mileage of 1,000 per nth.

Texas Boy Wins Trip to the Four-H Club Congress by Forestry Work

Fourteen-year-old Charles Jameson, of Tatum, Tex., won a free trip to the National Four-H Club Congress in Chicago in December, 1928, by his successful management of an acre of poor-quality farm woodland. The trip was paid for by the East Texas Chamber of Commerce. The acre of his father's farm on which Charles worked has pine, all under 6 inches in diameter, growing on about half of it and persimmon trees below merchantable size on one-quarter. The remaining quarter is without tree growth. The boy has built fire lines, carried out measures to protect the trees from insects and diseases, made improvement cuttings, collected forest-tree seed for sale and planting, and planted and cared for a small forest nursery from which he made an exhibit at the county fair. In 1928 wages for himself at 30 cents an hour, 25 cents an hour for the use of a horse, and taxes amounted to $8.62, and the value of the products, chiefly firewood, amounted to $11.20. An additional $1.20 was credited to his account from the pasturage of livestock. The nursery cost him $1.52, but the value of the trees in it is just about equal to that sum. Next year these trees are to be used in reforesting the barren part of the acre.

* * *

A farmer in Richland County, Ohio, recently sold 86 white ash trees for $850 on the stump to a buyer who had offered him $300 for them before they were estimated by Extension Forester Dean and County Agent Gilkey. The volume of the trees was estimated at 26,000 feet.

Forest Service Notes

orest Service Appropriations for the Fiscal Year 1930

The new agricultural appropriation act provides 3,024,280 for the support of Forest Service activities, clusive of road and trail construction and mainte- nce, in the year ending June 30, 1930. This rep- ents an increase of $480,212 over the amount allowed this purpose in the present fiscal year, aside from ary increases under the Welch Act.

An increase of $189,098 over the current appropria- n for forest fire protection work in cooperation with States and for the study of forest taxation and tim- r insurance brings the 1930 fund for those purposes $1,400,000. An increase of $56,088 will make $645,- 0 available for improvements on the national forests. propriations of $585,000 for forest products re- arch, $413,000 for silvicultural investigations, and $67,000 for range investigations represent increases of $42,404, $35,593, and $14,320, respectively, over the amounts currently available for work in these fields. The administrative organization outside Washington receives an increase of $75,714, bringing its total allowance for salaries and expenses to $6,703,000; the sanitation and fire prevention fund, which is used for the construction of national forest camp-ground improvements, grows by $10,000, becoming $50,000; and cooperation with the States in the distribution of forest planting stock wins an increase of $7,520 that makes the total appropriation for this purpose $83,000.

The appropriation for the purchase of additional lands for national forests remains at $2,000,000.

Two new projects authorized by the McSweeney-McNary Act, a national survey of the timber situation and a study of the cost and returns of timber growing, are to be launched in the coming fiscal year with appropriations of $40,000 and $25,000, respectively.

Large National Forest Purchase Program Approved

One of the largest programs ever submitted to the National Forest Reservation Commission was approved by the commission on February 21. The commission approved for purchase 234,920 acres of land representing an obligation of $944,000. Among the 149 cases covered by this authorization are 27,067 acres in Pennsylvania, including the Heart's Content area, which will become an addition to the Allegheny National Forest; 49,631 acres in the Ozark National Forest, Ark., most of which was offered by the Missouri-Pacific Railroad Co.; 47,602 acres in the Ouachita purchase unit, Arkansas; 25,198 acres in the Kisatchie and 11,230 acres in the Catahoula unit in Louisiana, which will be the first land purchased in that State for national forest purposes; a first purchase of 34,010 acres in the Keweenaw unit, in Michigan; and 10,618 acres in the Marquette unit, Michigan. The 10 smaller purchases comprise 29,564 acres in Minnesota, Michigan, Alabama, Georgia, South Carolina, North Carolina, Virginia, West Virginia, Tennessee, and New Hampshire.

The commission approved as national forest purchase units, under the provisions of the Weeks law, the private lands within the Choctawhatchee and Ocala National Forests, Fla., and a third area in Florida to be known as the Osceola.

More Evidence Against Broadcast Burning

In northern Idaho, a logged area on which enough trees have been left to form half the normal forest canopy is usually safe from spread of fire one or two days longer after each good summer rain than a similar area that has no shade, according to the results of a 4-year study by H. T. Gisborne of the Northern Rocky Mountain Forest Experiment Station. The higher degrees of inflammability, likewise, do not occur in ground fuels under half shade for one or two days after they occur in fuels that have no shade whatever. Apparently the presence of a half canopy lengthens the periods of safety by about 9 per cent and decreases the periods of great danger in like proportion. During the 1928 fire season, maximum temperature in the duff on the fully exposed area studied averaged 7° higher than that under a half canopy.

This result of shading argues in favor of piling and burning and against broadcast burning as a method of disposing of logging slash in the northern Rocky Mountains. The latter method in killing most of the residual stand, as it usually does, not only eliminates the potential value of the remaining trees in themselves and as a shelter for reproduction but intensifies the difficulty of protecting the logged area from later fires. Incidentally, the more moist conditions maintained in ground fuels under partial shade cause more rapid cay of the fuels, and in this way, also, reduce the p able cost of fire protection and the probable losse case of fire.

Wilderness Areas on the National Fore in California

Without pretending that the national forest California include 1,500,000 acres of actual wilder the Forest Service is planning to preserve primi conditions on about that much of their area. Chi in order to protect recreational values, 14 sepa tracts embracing parts of 15 of the forests have b designated to remain in a state close to that of land. These areas will not be developed by r building or opened to any form of permanent rec tional occupancy under permit. In general, they located in the higher mountain regions where the hazard is not great and where roads are not nee for forest administrative purposes. Much of the l will be subjected to grazing, and on some of it th may be some timber cutting or waterpower devel ment in years to come.

The areas and their locations are as follows:

Middle Eel-Yolla Bolla: More than 200,000 ac around Yolla Bolla Mountain and at the head Middle Eel River on the California and Trinity Fore

Agua Tibia: 27,000 acres on the west end of Palon Mountain on the Cleveland Forest.

Desolation Valley: Some 41,000 acres north Echo Lake and west of Lake Tahoe on the Eldora Forest.

Salmon-Trinity Alps: About 130,000 acres at headwaters of Trinity and Salmon Rivers on Klamath, Shasta, and Trinity Forests.

South Warners: 75,000 acres around Eagle Peak the South Warner Mountains on the Modoc Forest

Hoover: 23,000 acres west of Mono Lake on Mono Forest, named after the former superintende of the Bodie mines.

Dana-Minarettes: 87,000 acres lying between Tio Pass and the Devil Post Pile country on the Mo and Sierra Forests.

Murphy Hill: About 12,000 acres surroundi Campbell, Morris, and Lotts Lakes west of Beld on the Plumas Forest.

San Gorgonio: About 19,000 acres covering t San Bernardino and San Gorgonio range on the S Bernardino Forest.

Telegraph Peak: 7,500 acres around Telegraph Pe on the San Bernardino Forest.

San Jacinto: About 22,000 acres covering the hi country east of Idyllwild and Keen Camp on t San Bernardino Forest.

Ventana: Some 52,000 acres of wild mountain la at the north end of the Monterey division of the San Barbara Forest.

Emigrant Basin: 98,000 acres on the Stanisla Forest lying between Kennedy Meadows and t north boundary of Yosemite National Park.

High Sierra: About 700,000 acres including most the High Sierra crest on the Inyo, Sequoia, and Sier Forests, from Mount Whitney on the south to t Mammoth Lakes region on the north, a 75-mile stret of wild, rugged mountains.

estern Yellow Pine Seed Outlive Long Storage Without Special Treatment

Western yellow pine seed may remain viable for a g succession of years even without careful storage, ording to the results of recent tests at the South- stern Forest Experiment Station, Flagstaff, Ariz. the basis of these results western yellow pine would m to rank with jack pine and lodgepole pine in this pect, although unlike these species it does not give ign of the persistent vitality of its seed by retaining cones for many years.

Tests were made in 1928 on seed of many coniferous ecies, from different sources, that had been accumu- ing at the station since 1909. The seed had in all ses been placed in either cardboard tubes or cloth ks and stored on shelves in the greenhouse work- op. In this workshop, which adjoins the greenhouse, e temperature ranges in the course of a year as high 80° F. and as low as 10° F. Throughout the year e shop is well ventilated and is kept dry.

Seed collected in 1913 from western yellow pines owing on the Colorado Plateau, the region in which e experiment station is located, in 1928 showed a ability of 61 per cent. At the time when this sample as collected, a test showed it 82 per cent viable; us during 15 years' storage its annual loss of via- lity appears to have averaged only 1.4 per cent. ess favorable results were obtained with native estern yellow pine seed collected in 1909 that mani- sted relatively poor germinative quality at the art; having shown 51 per cent viability at the time hen it was collected, after 19 years' storage this mple showed a viable proportion of only 9 per cent. third lot, collected in 1917, showed only 59 per cent bility after 11 years' storage. For this sample original test records were available, but from the sults of a test made on other native western yellow ne seed collected in the same year it appeared that e crop of that year had relatively low viability.

Ten samples of western yellow pine seed collected 1912 on as many different forests not on the Colo- do Plateau showed in 1928 an average germination rcentage of only 2.

A sample of Engelmann spruce seed collected on the n Francisco Peaks in 1925 showed a viability of 43 r cent at Flagstaff in 1928; another collected in the me locality in 1927 and stored at Flagstaff for 11 ars failed to germinate.

Apache pine (*Pinus apacheca*) collected in 1912 on e Chiricahua National Forest (now the Coronado ational Forest), Ariz., germinated in the proportion 51 per cent before storage and in that of 20 per cent the end of 16 years.

Some imported seed collected in 1910, including uropean larch, Norway spruce, and Scotch pine, ere tested but failed to germinate.

Results of Thinning Jack Pine Plantations in Nebraska

Early results from the first experimental thinning of Jack pine (*Pinus banksiana*) plantations established on the Nebraska National Forest in 1911 indicate that diameter growth is stimulated directly as the space between trees is increased, at least until the density of the stand is reduced to 700 trees per acre. Some plots have shown a slight stimulation of height growth after thinning. One plot was thinned and measured in December, 1920, and a group of three plots were thinned with varying degrees of severity and measured in March, 1923. The first remeasurement of these thinned plots and of adjacent unthinned plots was made late in 1926.

Stagnation has not as yet become a serious factor in the unthinned plots, which originally averaged about 2,400 trees per acre. For this reason and also because of lack of information on the rate of growth of larger trees, on the productive capacity of the soil, and on the kind of crop that may most profitably be grown and marketed, a prediction of the future yield of these plantations on the Nebraska sand hills is not justified. At the present rate of diameter growth as shown by the measurements a plantation thinned to a density of 700 trees per acre 10 years after it is established will produce 8-inch diameters in 20 years, and one thinned at that time to a density of 1,500 to 1,600 trees per acre will produce 8-inch diameters in approximately 30 years.

From the standpoint of diameter increment, Assistant Silviculturist Jacob Roeser concludes after a study of the data at hand, a very heavy thinning is most desirable; from the standpoint of protecting the soil and of providing against possible losses in the stand, however, it appears that it is desirable to leave about 900 trees per acre 10 years after planting.

Volume of Solid Wood in a Cord of Maple

Measurements made by foresters of the Lake States Forest Experiment Station on hard maple cordwood cut near Ruse, Mich., showed that a standard cord made up of round sticks of different diameters contained, on the average, the equivalent of 80 cubic feet of solid wood if the bark had not been removed from the sticks and the equivalent of 65 cubic feet of solid wood if the bark had been removed. The average content of a single cord made up of round sticks having a middle diameter of 5 inches was found to be 50 cubic feet if the bark had been left on the sticks, and 39 cubic feet if the bark had been removed. The corresponding figures for a cord made up of round sticks with a middle diameter of 20 inches were 88 cubic feet and 73 cubic feet.

Frost Retards Growth of Planted Redwood in Oregon and Washington

The early fortunes of 17 plots of redwood trees planted by the United States Forest Service in western Oregon and Washington indicate that the redwood is too susceptible to frost injury to do well in this region except at low elevations. Because of the tree's rapid growth and its ability to coppice, foresters and timberland owners in the Pacific Northwest have taken considerable interest in the possibility of introducing it there. The natural range of the species has its northern limit in the extreme southwestern corner of Oregon, only a few miles from the California line.

In plantings made at elevations of from 750 to 3,000 feet in the Coast Range and the Cascade Mountains, many of the trees were killed outright by frost and others have been frozen back repeatedly with the result that they are but little taller now than when they were planted, although all but one of these plantings were made in 1924.

In 2 plantings made on shallow rocky soil and 1 on an area of almost pure sand, mortality was complete. On 1 plot cattle grazing interfered with the reliability of the test. Of the remaining 13 plots one had a survival percentage of 12 and the others showed survivals ranging from 44 to 72 per cent. It is pretty clearly established that fair survival may be obtained with plantings at low elevations in the coast region; whether the surviving trees will make normal growth appears, however, to be very questionable.

Indications are that growth of young redwoods is greatly retarded by the dense cover of herbaceous vegetation common in most areas of western Oregon and Washington. The best growth made by any of the plots took place in Mount Hebo—the furthest north of all the experimental planting sites—where the trees were planted in the open at the base of a new highway grade.

Training Camp of the Southwestern National Forest District

To give practical training to new employees in the fundamentals of their work and to keep men older in the service up to date in methods of forest fire protection and of forest and range management the Southwestern National Forest District has for five years held an annual training camp. The training camp held in 1928 offered a 3-week course both to the junior and to the more advanced class. The instructors included, together with Forest Service men, local representatives of the Bureau of Biological Survey and the Bureau of Plant Industry. Men of the National Park Service and the Arizona Extension Service were admitted as students. With only one exception all the forest supervisors, deputies, rangers, and assistant rangers in the district have attended one or another of the five annual camps.

Shortleaf and Loblolly Pine Litter a Humus a Valuable Fertilizer

By W. R. MATTOON, United States Forest Service

Analysis has been made by the Bureau of Cher istry and Soils of samples of leaf litter and hum which I collected from the forest floor in three pu second-growth stands of shortleaf and loblolly pine North Carolina. In these stands the trees were fro 30 to 40 years old and there had been no fire for years, perhaps never.

In each of the three stands from which samples we taken the layer of dry organic matter on the fore floor was of about the same depth and weight. averaged about 3 inches in thickness, and in weig about 1 pound per square foot. (In addition, the was about 1 pound of siliceous matter, or mineral so per square foot.) Allowing one-fourth of the area f tree trunks and bushes, I estimate that there were n less than 16 tons of organic litter on an acre. If th estimate is correct, according to the results of tl chemical analysis the litter on 1 acre of the unburne shortleaf pine woods contains 202 pounds of nitroge 77 pounds of potash, and 41 pounds of phosphor acid. At wholesale commercial prices this material worth $42.88. For the lowland and upland loblol pine woods the corresponding values are $38.08 ar $41.60, respectively.

The proportion of the weight of the litter and hum that was found to be formed by nitrogen, potash, ar phosphoric acid, respectively, is given in the followir tabulation, together with figures indicating the whole sale commercial value of these constituents as fertilize

SHORTLEAF PINE WOODS (UPLAND)

	Per cent of weight	Pounds per ton of litter	Value per pound	Value per ton of litter	Valu per acre
Nitrogen (NH_4) (ammonia)	0.631	12.6	$0.18	$2.27	$36.
Potash (K_2O)	0.240	4.8	0.06	0.29	4.
Phosphoric acid (P_2O_5)	0.127	2.5	0.05	0.12	1.
Total				2.68	42.

LOBLOLLY PINE WOODS (LOWLAND)

Nitrogen (NH_4) (ammonia)	0.578	11.5	$0.18	$2.07	$33.
Potash (K_2O)	0.171	3.4	0.06	0.20	3.
Phosphoric acid (P_2O_5)	0.112	2.2	0.05	0.11	1.
Total				2.38	38.

LOBLOLLY PINE WOODS (UPLAND)

Nitrogen (NH_4) (ammonia)	0.612	12.2	$0.18	$2.20	$35.
Potash (K_2O)	0.178	3.5	0.06	0.21	3.
Phosphoric acid (P_2O_5)	0.190	3.8	0.05	0.19	3.
Total				2.60	41.

Aside from the fertilizing value of leaf litter, con sideration must be given to the value arising from it mulching or water-absorbing properties. This valu realized in the increased growth of the trees, if the ter is left in the woods, or of crops if it is transferred cultivated fields. As a matter of fact, the value the mechanical improvement of the soil through the plication of woods mold is probably fully equal to the st of gathering and applying it, leaving the chemical rtilizer value as a net profit in the transaction.

It appears likely that in a well-stocked stand of uthern pine about a ton of litter per acre is dropped arly. Because of decomposition, leaching, and wind tion, the humus accumulates at a slow rate and parently reaches an approximate balance between in and loss.

rees from the States Planted in Alaska

By R. F. Taylor, United States Forest Service

A beginning has been made in introducing exotic ee species into southeastern Alaska, with some sults of promise.

Climate seems to offer no explanation for the absence om this region of tree species native to the shores of uget Sound. Mean annual temperature for Juneau, aska, is approximately 42.2°; for Longmire Springs, ash., it is approximately 43°. Annual precipitation erages for the two points are 80 and 103 inches, spectively. Douglas fir and other trees from the ate of Washington have been favored in the choice exotics for experimental planting.

One Douglas fir planted in 1913 at Sitka, near the tional monument, is now 11½ feet tall and is making average growth of from 10 to 12 inches a year. he 14 other trees of the same species that were planted th this one were destroyed by cattle. About 50 out 100 Douglas firs from Washington procured by the rest Service in 1922 for B. M. Behrends and planted a glacial flat 9 miles from Juneau survived their st five years on the site and at the end of that time ere making normal growth. Two dozen Douglas fir, western yellow pine, and 6 silver fir from Washing- n planted at Seward in the spring of 1926 were re- rted a year later as doing well. In the spring of 27 a shipment of 600 Douglas fir, 125 noble fir, d 125 silver fir from Washington were distributed Ketchikan, Craig, Sitka, Cordova, and Anchorage d were planted mostly by forest rangers. Douglas s that were properly cared for and planted on suitable es have given good results; those handled without re have in most cases failed to survive. The silver and noble fir have not as a rule done very well, and lwood and western yellow pine show a tendency to ss out with little resistance.

Remarkable promise was shown by some Scotch ne from Illinois planted on the Mendenhall Flats, ar Juneau, by J. P. Anderson, a local florist. After o years in the field the pines proceeded to grow to 24 inches a season. This planting has been stroyed by cattle.

No information is yet available as to the ability of Douglas fir or Scotch pine planted in Alaska to produce viable seed.

The Oak Type of Arizona Woodland

By Quincy Randles, United States Forest Service

Among the so-called woodland types of Arizona the oak type is rather an exception in that it makes fairly rapid growth. Growth studies show that in this type trees 12 inches in diameter outside the bark at stump height can develop from sprouts in 50 years. In general the Arizona woodland types make slow growth. Aside from the oaks these types, which for the most part occur at elevations below the western yellow pine type and on the drier sites within it, consist of juniper, juniper and piñon, and various other combinations. The use of the woodland species in the region is very largely for cordwood and posts.

In the oak type are represented approximately a dozen species, of which those forming the greater part of the volume of commercial stands are emory oak (*Q. emoryi*), occurring on the better sites, Arizona white oak (*Q. arizonica*), on the drier locations, and whiteleaf oak (*Q. hypoleuca*), occurring toward the upper limits of the type.

Reproduction in this type is almost entirely from sprouts. Not all the stumps sprout from the root collar. Counts in cut-over areas indicated that the proportion of the stumps having thrown out sprouts at their base varied from 25 per cent to 65 per cent, according to the maturity and soundness of the trees and the dryness of the site. Sprouts occur not only from the base of the stump but from the roots; and in spite of the fact that not all stumps sprout the stands are maintained in good shape, because a certain proportion of the roots throw out sprouts several feet away from the stump. As a rule, if fire and grazing are controlled the cut-over stands are maintained in good reproductive condition. A very good stand of young healthy trees of various ages was disclosed by recent examination of an area on which selective cutting has been going on for more than 50 years. This area has had good protection from fire and has been grazed rather lightly.

The oak makes an excellent fuel wood, although the juniper is preferred for this purpose by most people because it works up easily and is set on fire with much less difficulty than the oak.

* * *

Milwaukee, Wis., has been chosen as headquarters for the recently created Lake States National Forest District. District Forester E. W. Tinker will occupy offices in the Appraiser's Stores Building until the new Federal Building is ready for occupancy.

General Forest News

Selective Logging on Menominee Lands

By Crosby A. Hoar, United States Forest Service

On the Menominee Indian Reservation, in northeastern Wisconsin, selective timber cutting is now well established, under the direction of Forester Lloyd O. Grapp. The selective system was introduced in the winter of 1924–25, in the cutting of 35 acres. In the winter of 1925–26 80 acres were cut selectively, in 1926–27 370 acres, and in 1927–28 700 acres. The total area cut over each year has been from one to two sections. From now on Mr. Grapp intends to practice selective cutting exclusively or almost so.

The region is favorable for the growth of northern white pine, hemlock, and mixed hardwoods including chiefly maple, basswood, and yellow birch. The advanced second growth runs strongly to maple and basswood. Mr. Grapp tries to take out as much hemlock as possible from the mixed stands, but where hemlock is the predominant tree he cuts lightly. In other words, he intends to favor hardwoods over hemlock in general, but where hardwoods are scarce he is not willing to open up the stand by cutting hemlock heavily. The selective cutting is on a 35-year rotation. In 1926–27 it took 14,300 board feet to the acre and left 5,500 board feet.

All timber is marked for cutting. An interesting feature of the marking is that the upper blaze is placed at the point where the marker expects the cutters to saw. The stump height is regulated in that way instead of by an arbitrary rule. (The same practice is followed by the Goodman Lumber Co., Goodman, Wis.; and in this company's practice the blaze also indicates the direction in which the tree is to be thrown, being placed opposite the intended undercut.)

Mr. Grapp finds that selective cutting has not materially increased the cost of his logs loaded on cars in the woods. The cost of railroad spurs is somewhat higher because of the larger mileage required to produce the desired quantity of logs.

There is no slash disposal in the usual sense, but the quantity of brush left on the ground is reduced by cutting out and shipping all the top and limb wood down to about 4 inches in diameter. This is done under contract, the present contract calling for 10,000 cords to be taken from the woods by the operator and delivered to the manager of the Indian reservation at a stated price. The wood is sold green to a dealer who sorts it himself and resells it for various purposes such as chemical wood and firewood. This operation just about pays for itself. The slash left on the ground in most cases is small enough and is scattered evenly enough not to present a serious fire menace. T cutting area that I visited when on the reservati last summer was in excellent shape.

Paper Company in Wisconsin Carryin Out Important Planting Program

The Nekoosa-Edwards Paper Co., Port Edward Wis., is beginning its fourth year of forestry work wi 890 acres of land already planted, 180 acres plow ready for spring planting, and about 1,900,000 you trees growing in its own nursery. The holdings of th company include something like 35,000 acres of la in Wood, Ashland, and Sawyer Counties, Wis. T company's planting equipment includes two 10-t Holt caterpillar tractors, which pull 24-inch botto breaking plows. For protection from forest fires t company has supplied itself with three lookout towe about 18 miles of telephone line, and three fire truc with Evinrude fire pumps, Smith Indian hand f pumps, and the necessary tools and pails.

From the first this company's forestry activities ha been directed by F. George Kilp.

In the spring of 1926, 100,000 2-year-old seedlin were bought and planted on barren spots and op fields on the company's property. In the same seas the nursery was started at Nepco Lake, with a capaci of 500,000 Norway pine and jack pine seedlin Spring planting in 1927 was limited to 20,000 jack p seedlings and transplants, because no more could purchased from the Federal and State Governments; the fall of that year, however, a planting crew was s to work with stock of the company's own raisin Planting was continued on a large scale in 1928. that year, also, a reforestation survey of cut-over lan in Ashland and Sawyer Counties was completed a these lands were improved with the construction of miles of telephone line, an 81-foot steel lookout tow with inclosed top, several miles of dirt road, and 3-room tile ranger cabin.

In 1928, when the company's field planting oper tions covered many areas ranging from 1 to 12 acres extent, its total planting costs per acre averaged $5.6 (Approximately 1,350 trees were planted per acr In 1929, when he intends to plant 1,200 acres all large areas, Mr. Kilp expects to keep expenses bel $5 an acre.

Seed have been bought to raise 3,500,000 trees in t company nursery during 1929.

Beginning with 1930, the company plans to pla 3,000 acres per year.

Lumber Industry Appeals for Legislation Controlling Production of Lumber

In a resolution adopted at its December meeting the oard of directors of the National Lumber Manufacurers Association takes cognizance of efforts being ade to obtain Federal and State legislation permitting ontrol of production of oil and coal, and takes the osition that any such legislation should likewise perit control of the production of lumber. Copies of is resolution were sent to the President of the United tates, the President elect, the heads of the departents of the United States Government, and each ember and Member elect of the Seventy-first Conress.

Secretary of Agriculture Jardine, in commenting on e resolution, said:

> Orderly production is essential not only to the financial welfare of the mber industry itself but to the solution of the forest problem as a whole d the economic welfare of the Nation. For these reasons the problem lumber production not only should be dealt with but should be dealt ith constructively.
>
> It must be realized, however, that overproduction is only one of many mptoms growing out of the greater evil of overexploitation of the rests. * * * The actual lumber surplus, while of great influence market prices, is of little consequence to the conservation of our maining timber supply compared with the immense quantities of w-grade material sacrificed in a general effort for early liquidation, and of still less consequence compared with the loss of growth resulting om exploitation that fails to make proper provisions for a future forest. * * * In my opinion the reasons for preventing the waste of timber e as forceful as those for preventing the waste of coal or oil. The proosed legislation to prevent the overproduction of oil grew out of investiations of the Federal Oil Conservation Board appointed by the Presient as a means of protecting the public interest against the waste of l. Likewise, public assistance by legislation or otherwise to control roduction of lumber would have its justification in the protection of e public interest by preventing the waste of forest resources. There a distinction between the two problems in that oil is a "wasting" urce, whereas timber would be perpetually renewable if our forests re properly handled. While the public has a large interest in using e present supply of timber without waste, it has a much larger interest abolishing a more serious and in the long run a more costly type of aste, namely, the waste of the potential growing power of our forest nd that is caused by destructive methods of exploitation. The waste f low-grade timber and the other wastes connected with timber manucture and utilization are no more real than the waste resulting from perations that leave land unproductive. This waste of our basic forest esource is intimately associated with unregulated production. Any egislation or other public assistance to control the production of lumber o avoid waste of usable material should be coupled with plans and ndertakings by the public and by forest owners to keep forest land roductive and secure from destructive practices.
>
> * * * It is true that an adequate program of reforestation requires he leadership, cooperation, and action of the Federal Government and he States, as the lumbermen's resolution has pointed out. It is equally rue that this program requires the full and active participation of the rivate owners who control four-fifths of all forest land in the United tates.
>
> * * * There is need for a more complete understanding by all nterested parties of the whole problem and the relationship of its diferent parts. This might be arrived at through the medium of a broad ublic inquiry, through a Government commission or otherwise, aimed t the formulation of a broad national forestry program involving pecifically—
>
> (1) Public assistance in strengthening and stabilizing the forest indusries in order that they can undertake orderly production and continuous timber growing as an industrial enterprise, and increased advice and assistance to farmers and other small forest owners.
>
> (2) Larger public and private participation in forest fire protection in order to make it universal and effective.
>
> (3) Large extension of Federal and State ownership, an immediate and assured means of restricting the field of destructive exploitation by bringing a larger proportion of the forest area under productive management as a measure of public security.
>
> (4) Making public forests fully productive, especially through complete protection, more intensive management, and an adequate program of planting.
>
> (5) Aggressive cooperation with forest owners and industries to abolish destructive forest exploitation, and to create cooperative agencies to this end; and to stimulate larger industrial participation in an enlarged program of forest renewal.
>
> (6) Investigation of the importance and feasibility of public measures to prevent destructive forest exploitation, including a study of public measures to this end in other countries.

Migratory Bird Sanctuaries Authorized

The Norbeck Act, signed by the President February 18, authorizes the creation of one or more natural woodland sanctuaries for game fowl and migratory birds in each State of the Union and in Alaska. Under the terms of this act a commission consisting of the Secretaries of Agriculture, Commerce, and the Interior, two Members of the Senate, and two Members of the House is to be responsible for selecting sites for these sanctuaries, working in cooperation with State authorities. The act authorizes an appropriation of $75,000 for the first year, $200,000 for the second, $600,000 for the third, and $1,000,000 for each of the succeeding seven years.

Congress Renames a National Park and Revises Boundaries of Another

An act of Congress recently approved gives the name Acadia National Park to the area on Mount Desert Island, Me., heretofore known as Lafayette National Park, and authorizes the Secretary of the Interior to accept as gifts for national park purposes certain headlands and islands off the island of Mount Desert. Another act recently given presidential approval provides for a revision of the boundaries of Lassen Volcanic National Park, Calif., to include approximately 24,280 acres of additional lands containing scenic features associated with volcanic phenomena and also some land that serves as a summer habitat for black-tail and mule deer and that is needed to provide adequate sanctuary and grazing ground for park animals.

* * *

A termite investigations committee has been organized by California industries. A fund of $50,000 contributed by various industries is to be used by the committee in finding ways and means to combat the destruction by termites of buildings, railroad ties, telephone poles, and other exposed wood.

Oyster-Shell Scale Invades the Yosemite

By H. E. Burke, United States Bureau of Entomology

An investigation made in the Yosemite Valley, Calif., during July and August, 1928, indicates that the oyster-shell scale (*Lepidosaphes ulmi* Linn.) has been working in the valley for several years. Many trees and shrubs have been killed, and many more are heavily infested and will die during the next few years unless control measures are undertaken.

The oyster-shell scale, a sucking insect, was introduced from Europe into the eastern United States before the Revolution. It has caused severe damage to several species of deciduous forest trees in many parts of the United States. According to published reports the ash is the tree most affected; but various species of poplar, willow, maple, and dogwood have been killed or seriously injured in New York, Ohio, Indiana, Illinois, North Carolina, Colorado, and Montana.

The most important deciduous tree on the floor of the Yosemite Valley is the black cottonwood (*Populus trichocarpa* Hooker). Checks made in various groves throughout the valley show that most of the trees of this species are infested and many have been killed by the scale. At the mouth of Cascade Creek 52 trees were found killed and 121 alive. Practically all the live trees were found to be infested, many so severely that they will probably die during the next two years. Near the mouth of Yosemite Creek 20 trees were found dead and 31 alive. West of the giant yellow pine, examination of a group of 31 trees showed that 23 were dead and the remaining 8 had but few living branches. These trees average about 18 inches in diameter and about 75 feet in height. In addition to the trees counted, many saplings one-half inch or larger in diameter were infested and dying or dead.

Besides the cottonwood, the pest in the Yosemite infests and kills the willows (*Salix lasiandra* Benth. and *S. lasiolepis* Benth.) and the creek dogwood (*Cornus occidentalis* [Torr. & Gray] Cov.); many groups of dead willows can be seen and a few groups of dead dogwood.

Numerous examinations disclosed no infestation of the white alder (*Alnus rhombifolia* Nutt.), the bigleaf maple (*Acer macrophyllum* Pursh), the Pacific dogwood (*Cornus nuttallii* Aud.), or the western azalea (*Azalea occidentalis* Torr. & Gray). In some localities branches of the Pacific dogwood interlaced with heavily infested branches of the creek dogwood were found to be clean. No scale could be found on aspen (*Populus tremuloides aurea* [Tidestrom] Daniels) examined in the Little Yosemite, which is 2,000 feet above the main valley.

The protection given to this insect by its waxy, armorlike scale makes it difficult to control. Spraying with lime-sulphur or with crude-oil emulsion when the brood hatches in the spring is recommended. If thoroughly applied at the proper time these sprays will kill most of the insects and will keep the infestation down for three or four years.

Lodgepole Not Taboo to Western Pine Beetle

By F. P. Keen, United States Bureau of Entomology

Near Bly, in Klamath County, Oreg., I recently found the western pine beetle (*Dendroctonus brevicomis* Lec.) vigorously attacking living lodgepole pines (*Pinus contorta* Loudon). Extensive galleries had been formed by the parent adults; eggs had been laid and larvæ had developed. In other trees a generation of the insects had reared its broods and the broods had emerged.

Forest entomologists of late had felt confident that the western pine beetle's attacks were restricted to western yellow pine (*Pinus ponderosa* Laws.) and Coulter pine (*Pinus coulteri* D. Don). In United States Bureau of Entomology Bulletin 83, Part I, 1909, A. D Hopkins reported it as attacking sugar pine (*Pinus lambertiana* Dougl.); but for many years the authenticity of this record has been in doubt.

My observations indicating that the western pine beetle is quite capable of attacking and killing lodgepole pines were made on areas where many western yellow pines were being killed by the beetle. The attacks on the lodgepole pines represented an overflow. No immediate anxiety need be felt that the beetle will become a serious enemy to this pine, already oversupplied with destructive insect pests. Western yellow pine is still the preferred host, and attacks on lodgepole represent the abnormal or unusual condition. This is just another illustration of the adaptability of insect life and a warning not to attempt to lay down hard and fast rules of conduct for any insect species.

Fire, Beetle, and Budworm Change Stand Composition

A bit of forest war history from the Modoc National Forest is contributed by F. C. Craighead, of the Bureau of Entomology. On Sugar Hill, in the Warner Mountains, a fire occurring some 80 years ago killed a mature mixed stand of western yellow pine and fir A dense stand of reproduction about half fir and half pine came in after the fire. This stand is now about 70 years old. It appears that the pine was dominant and was beginning to suppress the fir when between 1920 and 1922 it was attacked by the mountain pine beetle (*Dendroctonus monticolae*). More than 90 per cent of the pine was killed by the Dendroctonus attack leaving a practically pure fir forest. The fir, however was attacked by the spruce budworm in 1922, as it had been attacked also in 1915, according to evidence in the annual rings. A considerable portion of the fir died from this cause and from subsequent attack by the fir barkbeetle. The few pines that had survived the Dendroctonus attack undoubtedly benefited by this thinning of the fir, and it appears probable that the ultimate result will be again a mixed stand of fir and pine.

Satin Moth Regulated Area Extended

A revision of the quarantine on account of the satin oth, effective January 1, 1929, adds to the regulated rea 21 towns in Maine, 51 in New Hampshire, 8 in ermont, 33 in Massachusetts, and 59 in Connecticut. he new area amounts to about 5,116 square miles. his quarantine prohibits the movement of poplar and illow trees and parts thereof capable of propagation om the regulated territory to outside points; because ie insect hibernates in inconspicuous webs on the bark f the trees, it is practically impossible to determine atisfactorily by inspection whether poplars and willows re infested with it or not.

apanese Beetle Regulated Area Enlarged

A revision of the Japanese beetle quarantine, effective ebruary 15, enlarges the regulated area to include part f Cecil County, Md.; 11 townships in the southern part f New Haven County, Conn.; all of Delaware north f Sussex County, and the town of Milford in that ounty; and Rye Township in Perry County, Pa. n additional regulated area is designated, consisting f the District of Columbia and part of Virginia; wing to the slight degree of infestation in this area, owever, interstate movement of farm products from he area is to be unrestricted for the 1929 season. hipments of farm products from New York City are rought under the same certification requirements as pply in the remainder of the main regulated area.

Western Red Cedar Shows at Front in Olympic Regatta

The shell in which the University of California crew ced to an Olympic championship last summer was uilt of western red cedar (*Thuja plicata*). It was the product of George Pocock, veteran shell builder of Seattle. Until two years ago Mr. Pocock built shells of "Spanish cedar" (*Cedrela odorata*). Substitution of the native western red cedar enabled him to cut 30 pounds from the weight of the shell, reducing it to 270 pounds—hardly 34 pounds to an oarsman. The oars used by the Californians were made by Pocock of Sitka spruce, each oar being built up of 13 different parts.

* * *

A 1,500-acre tract of cut-over long-leaf pine land in Caldwell Parish, La., is being developed as a reforestation area by Henry E. Hardtner, who in honor of Professor Chapman, of the Yale Forest School, has christened it the Herman H. Chapman Forest. The area has been fenced with hog-proof wire, fire lines have been built around and through it, and John Perkle has been installed as warden. Mr. Hardtner predicts that this land, worth not more than $3,000 at present, in 60 years will produce more than $1,000,000 worth of pine timber and by-products.

Pioneers Judged Soil Quality by Tree Species

[Excerpt from Travels to the Westward of the Allegany Mountains, by F. A. Michaux, London, 1805]

In Kentucky, as well as in Pennsylvania, Virginia, and the Carolinas, the land is divided into three classes, for the more equal assessment of the land tax. This division, which is according to the fertility of the land, has a different relation in each State: thus, in Kentucky, for example, they put the same sort of land into the second class, which, east of the mountains, would belong to the first; and, in the third, they rank such as, in Georgia and Lower Carolina, would be put into the second. I do not, however, mean to be understood by this, that there are no lands in the Eastern States, as fertile as those of the West; but they are not common, and are seldom met with but by the sides of rivers and in the vallies, and do not include such a considerable extent of country as in Kentucky and that part of Tennessee to the westward of the Cumberland Mountains.

In these two States they appreciate the degree of fertility of the lands by the different species of trees which grow upon them: thus when the sale of a lot of land is advertised, they are careful to specify that such or such kind of trees grow on such or such parts, which is sufficient information to the purchaser. This rule, however, admits of an exception, with respect to the *Barrens* (meadows), the soil of which, as I have mentioned, is very fertile, and on which, nevertheless, there are found the *Scroby oak*, *Quercus nigra*, and the *Juglans hickery*, which, in the forests, are evidences of the worst soil. Supported by this mode of estimating the fecundity of the soil by the nature of the trees which it produces, I shall mention a very remarkable observation, which I made as soon as I arrived in this State.

In Kentucky and Cumberland (that part of Tennessee which lies west of the mountains of that name) independently of a few trees, which are peculiar to these countries, the mass of the forests, in lands of the first class, is composed of those species which are very rarely met with, to the east of the mountains, in the most fertile soils: these species are principally the following, *Cerasus virginiana*, cherry tree; *Juglans oblonga*, white walnut; *Pavia lutea*, buck eye; *Fraxinus alba, nigra, cerulea*, white, black, and blue ash; *Celtis folliis villosis*, ackberry; *Ulmus viscosa*, slippery elm; *Quercus imbricaria*, black-jack oak; *Guilandina dioica*, coffeetree; *Gleditsia triacanthos*, honey locust; and, *Annona triloba*, papaw, which rises to the height of thirty feet. These three last species, in particular, denote the richest lands. In cool mountainous places, and by the sides of the rivers which have not steep banks, there are also found the *Quercus macrocarpa*, over cup white oak, the acorns of which are as large as a hen's egg; the *Acer saccharinum*, sugar maple; the *Fagus sylvatica*, beech; and also the *Platanus occiden-*

talis, plane; the *Liriodendrum tulipifera,* white and yellow tulip-tree; and the *Magnolia acuminata,* cucumber-tree, the three last of which attain to a circumference of eighteen or twenty feet. The plane grows to a larger size. The two species of tulip tree, with white and yellow wood, have no external character, either in the leaves, or in the flowers, by which they can be distinguished from each other, and as the yellow wood is most used, before a tree is felled, a piece is cut out, to ascertain whether it is of this species.

In the lands of the second class, are found *Fagus castanea,* chestnut; *Quercus rubra,* red oak; *Quercus tinctoria,* quercitron; *Laurus sassafras,* sassafras; *Diospiros virginiana,* persimmon; *Liquidambar styraciflua,* sweet gum; *Nyssa villosa,* gum-tree, a tree which neither yields gum, nor resin, as its name seems to imply.

Those of the third class, which are generally arid and mountainous, scarcely produce any but the black and red oak; the *Quercus prinus montana,* rocky oak, some pines, and sometimes Virginian cedars.

Does the Cypress Need Its Knees?

Cutting the knees of cypress trees near Belle River in St. Martin Parish, La., 14 years ago appears to have placed the trees at only a slight disadvantage as compared with untreated trees in the same stand. The cutting was done on 15 trees in May, 1914, by W. R. Mattoon of the United States Forest Service and E. T. Forgey of the Jeanerette Lumber & Shingle Co. At the same time 15 untreated trees of comparable size were tagged. The reexamination was made in July, 1928, by G. H. Lentz, special investigator for the Louisiana Division of Forestry, with the help of Mr. Forgey and J. A. Putnam. Difficulty was encountered in locating and identifying the trees; the 1-inch numbered copper tags with which they were marked had in nearly every identified case been overgrown with wood, often an inch or more in thickness, and at the time of reexamination the site was 3 feet deep in water. The 9 treated trees that were identified had all survived, and increment borings showed that although their diameter growth had slowed down slightly between 1914 and 1918 it had then become normal. On the 6 marked untreated trees that were identified in 1928 no retardation of growth had taken place. Although the depth of the water prevented definite observation as to whether the trees from which the knees were cut afterward developed new knees, no such new knees were detected in the reexamination.

* * *

The A. S. Carr Co. finds it profitable to ship crude resin from its operation in longleaf pine timber near Dorchester, Dorchester County, S. C., by railroad to its still in Savannah, Ga., a distance of 151 miles.

Seed Disinfectants in Forest Tree See Testing

By Henry I. Baldwin, Brown Co., Berlin, N. H.

One of the commonest difficulties encountered in see testing is variation in the results obtained with two (more samples of the same lot of seed. In order t establish standards of accuracy certain toleranc of variation have been set up in agricultural see testing practice, and these may be applied as we to the testing of forest-tree seed. If two samples of th same lot of seed germinate under absolutely identic conditions the differences between them in germinativ energy, final germination percentages, etc., represent th error of sampling, which follows the laws of probabilit more or less closely according to the mechanical accurac of the sampling device and the seed counter. No matte how complete the control of physical factors, howeve absolutely uniform germinative conditions seldo maintain in two samples, owing to inequality betwee samples in infection and growth of mold. Mol spores exist on nearly every seed coat, and mol development during the period of germination tests practically inevitable unless the seed are disinfecte in some manner. In disinfecting seed that are to b tested the sole purpose is to reduce the variatio between duplicate samples by reducing uncontrolle mold attack; preferably the treatment should n stimulate or retard germination in uninfected see

In testing forest tree seed in soil and sand Toume Bates, and others have tried partial disinfection of th soil and sand with formalin, sulphuric acid, et Usually this has somewhat reduced germination. I the last few years a considerable number of organ mercury compounds have been placed on the marke and have been tested eagerly by nearly all the ag cultural experiment stations. In these preparations small percentage of complex mercuric chloride com pounds is combined with from 80 to 90 per cent of ine matter. Without going into the already large litera ture on the subject, or referring to the results of fiel experiments, it may be remarked that uniformly sati factory results are not yet the rule, and that seed disin fection has not yet entered into the standard practic of the Association of Official Seed Analysts of Nort America or similar bodies. I will briefly describ some slight experiments of my own in using seed disin fectants in testing forest tree seed.

In these tests a water-bath apparatus adapted fro the Jacobsen type of germinator was used. This ap paratus, which is similar to those in use at nearly all th seed-testing laboratories for forest tree seed abroad, ha given quite consistent results for two years. Only tw treatments were tried—a 0.5 per cent solution (uspulun, and dry Bayer's Dipdust. In the first cas the seed to be tested were soaked for 10 minutes in th uspulun solution and then thoroughly rinsed with di ed water on a strainer before being put in the ger- nator. Because of the difficulty of handling spruce d other small seed when wet, it was found necessary dry the seed before counting them out and arranging em on the filter papers. Germination of seed treated h uspulun was invariably retarded. C. R. Orton, charge of the research division of the Bayer Co.'s icultural department, located at the Boyce Thomp- Institute for Plant Research, recommended 0.25 cent uspulun as a better concentration to use for e seed. However, since a study nearing completion the Brown Co.'s seed laboratory shows that spruce d are injuriously affected by solutions having an aline reaction and seem to germinate best at a ongly acid H-ion concentration, it was decided to card uspulun, which has a distinct alkaline reaction, ding more thorough investigation.

The procedure followed in trying Dipdust was in ordance with the recommendation of the Bayer Co. t the seed be shaken with no more dust than they uld take up. For 1 bushel of seed 2 to 2.5 ounces of pdust suffice, or about 1 part in 2,500 by weight. th small samples of seed received for testing it is not ays practicable to weigh out the Dipdust. In eral, dust is being used in too great quantity if it can detected on the seed coat with the unaided eye. In tests here described, enough dust to cover a space out 2 millimeters wide on the end of a knife blade s shaken in a small bottle with 100 to 200 of the seed. veral samples of seed received for routine testing re set up with Dipdust, duplicate samples being set untreated. A few of the results, condensed to show al figures only, are given in the following table:

Species	Germinative energy (per cent in 30 days)						Average variation between samples, and tolerance of variation			
	Untreated samples [1]			Samples [1] treated with Dipdust			Untreated		With Dipdust	
	A	B	Average	C	D	Average	Variation	Tolerance	Variation	Tolerance
us strobus	52	61	56	85	82	83	9	10	3	7
Do	64	70	67	80	74	77	6	8	6	8
es concolor	54	48	51	60	60	60	6	10	0	9
ea pungens	75	65	70	76	87	81	10	8	11	7
ja occidentalis	24	35	29	46	36	41	11	10	10	10

Abies concolor samples consisted of 50 seeds each. All others con- ed of 100 seeds each.

At the end of 10 days it was already apparent that Dipdust was effective in reducing the development mold. At an early stage, also, the Dipdust samples owed markedly greater germination than the un- ated ones. This advantage was somewhat dimin- ed toward the end of the tests. The final average ures show 10 per cent greater germination with pdust, although in one or two individual cases no significant advantage was apparent. In these cases less mold had developed on the untreated samples. It could not be ascertained definitely whether the higher percentages of germination in the treated samples were due merely to reduction in mortality from mold attack, or whether the chemical employed had a directly stimulating effect. The failure of treated samples to show more uniform results was disappointing. The variability was about the same with and without treatment, three out of five tests of each kind falling within the limits of accuracy.

On the basis of experience thus far, there would seem to be little merit in seed treatment in routine seed testing until careful experiment over a considerable length of time has given a firm basis for procedure and workable factors have been found for correlating tests under disinfected conditions with field conditions. These fragmentary results are presented in the hope that other workers may be led to attack the problem.

Whatever the value of seed disinfectants in seed testing, it would seem that their use in nursery practice might be well worth a trial.

Stock Company Organized to Manage Forest Lands

A stock company with a capital of $50,000 has been organized in the town of Dublin, N. H., for the purpose of owning and managing forest land in the vicinity of Dublin Lake. Lawrence W. Rathbun, a recent graduate of the Yale Forest School, has been placed in charge of the land owned by the corporation and will also have charge of the management of forest lands owned by individual stockholders.

Foresters in the South

An enumeration by the Southern Forest Experiment Station has brought out the fact that 138 men are engaged in forestry work in the territory of this station, which includes Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, Oklahoma, and Texas. All but 20 of these men have had some technical training in forestry or allied work. Lumber companies employ 32 of them, State forestry organizations 29, and the United States Forest Service 29. Consulting foresters and their staffs make up 19 of the number; men employed in forest products work, 16. There are 6 State extension foresters, 5 teachers in forest schools, and 2 city foresters. Residents in the territory who have had some forestry training but are not now engaged in forestry work number 43.

* * *

A bequest of $5,000 has been made to Northeast, Erie County, Pa., by its former burgess, the late George E. Pierce, for the purpose of reforesting the municipal watershed of 250 acres.

Meeting of Society of American Foresters

At the annual meeting of the Society of American Foresters, held in New York City December 28–29 with an attendance of about 200 foresters, it was announced that $30,000 has been given to the society by the Carnegie Corporation to finance a survey of problems in forest education. The survey will be conducted by the society's committee on education.

A resolution adopted at this meeting requests that the president of the society name a committee of three to take steps to bring to the attention of the President of the United States the importance of having a forester on the Mississippi River Commission. A second resolution requests the appointment of a committee of the society to consider problems connected with the maintenance of the productivity of forest lands in the United States and make recommendations to the society as to policies calculated to meet these problems. Other resolutions advocate that virgin areas of the more important original forest types be preserved by agencies controlling public forests; call attention to the too rapid exploitation of virgin timber, even in some areas in public ownership; recommend further investigation of spark-arrester problems by the American Society of Mechanical Engineers, and research at universities with the object of improving efficiency of combustion as well as of spark arrester design; urge that Congress make more adequate appropriations under the provisions of the Clarke-McNary law, the McSweeney-McNary law, and the McNary-Woodruff law, and that it enable the Department Agriculture to speed up the construction of f protection improvements on the national forests to do the necessary work to control the gypsy moth e of the barrier zone; and commend the efforts of orga zations and individuals in Arkansas to establish a St forestry department, extending the society's com ments to the governor and legislators of the State offering its assistance in the formulation of suita measures.

Officers elected by the society for the current y are: President, Paul G. Redington; vice preside John F. Preston; secretary, Raymond E. Ma treasurer, William N. Sparhawk; members of exe tive council, William G. Howard and J. S. Holmes.

* * *

The Long Island Railroad constructed about miles of fire lines adjacent to its right of way in summer and fall of 1928. Officials of the comp recently met in conference with Superintendent Lands and Forests W. G. Howard and other fores officials of New York State to seek means of reduc the fires burning along the road's right of way.

* * *

A 140-acre grove of redwoods opposite Redw Humboldt County, Calif., has been deeded to Save the Redwoods League by Mrs. Harris Whi more and family and is to be dedicated as a memo to the late Harris G. Whittemore.

Foreign Notes

Prussia's Forest Service Budget

By W. N. Sparhawk, United States Forest Service

The budget for the Prussian Forest Service for 1929 shows estimated gross income of $50,287,567 and estimated expenditures of $34,484,480, compared with actual income and expenditures in 1927 of $47,873,103 and $34,297,356, respectively. With a total State forest area of 6,078,870 acres, the estimated net income of $15,803,087 means a net return of $2.61 an acre. Owing to change in price levels this return per acre is actually less than the $2.51 received in 1913. The timber cut for 1929 is set at approximately 363,600,000 cubic feet (slightly under 2 billion board feet), or 60 cubic feet per acre. The 1913 cut was 51 cubic feet per acre, from a total area almost 25 per cent larger.

The income expected by the forest service from different sources of revenue is as follows: Timber, $45,220,000; other products, $1,978,400; game, $261,800; peat, $23,800; sale of land (agricult etc.), $963,900; forest schools and experiment stat $38,865; miscellaneous, including refunds of adva to forest officers, etc., $1,803,802. The fairly price expected for the timber, 12½ cents a cubic f is partly explained by the fact that timber is sold after it has been cut and skidded to a road.

Salaries of full-time statutory officers for amount to $6,305,572, and those of part-time offi temporary assistants, etc., to $1,129,963. In the organization will include 5,448 full-time and 1 part-time and temporary officers, compared with 6 of the former and 3,182 of the latter in 1913. retirement and dependent's pensions $2,105,70 provided, and for other allowances and adva $302,289. Besides, $72,153 is to be contrib toward the cost of uniforms, $30,535 is grante purchase and maintenance of vehicles for officers, $146,370 is budgeted for accident insurance.

travel expenses are estimated at $1,079,061, and
ght, telephone, printing, etc., at $274,890. The
est single item of expenditure is for logging,
06,000. Cost of making timber sales, leasing
ting privileges, etc., is estimated at $433,160, cost
game administration at $107,100, and cost of
latory animal control at $206,060. For construc-
and maintenance of buildings, including some
aordinary construction necessitated by deteriora-
during the war period, $1,576,440 is allowed, with
mit of $9,500 on any one building; in addition
400 is provided for forest laborers' quarters.

or planting, soil improvement, surveys, and cul-
l measures $4,046,000 is provided, besides a special
ropriation of $1,190,000 to reforest areas devastated
the French and by the owl moth. Maintenance
construction of public roads within the State
sts call for $1,547,000 (approximately 25 cents an
), and public roads and bridges outside the forests
of use in forest management call for $142,800.
stream-control work $71,400 is set up; for drain-
clearing fire lines, and establishing boundary lines,
,000. Only $540,260 is allowed for purchase of
st land and for preliminary management plans for
thus acquired. In 1927, $2,084,232 was spent
his purpose and the State forest area was increased
bout 100,000 acres. It is interesting to note that
ddition to constructing and maintaining public
s within and adjacent to State forests the State
taxes to local governments on the State forests,
e taxes for the year 1929 amounting to $3,332,000,
5 cents an acre. In 1913 the average tax was only
cents an acre. The forest schools, including
er schools and the higher schools, get $348,188,
of which is for new buildings. The average
y of the 18 full professors in the higher forest
ols is only $2,640. The forest experiment station
erswalde) gets only $21,658, and even this is much
than was granted in 1927. The small appro-
tion for research may be partly explained by the
connection between the station and the school
berswalde, and the fact that much of the research
is done by the professors.

Living Fire Lines

or regions not subject to hard frost L. Lavauden
e French forest service, recommends fire guards of
alyptus. The Eucalyptus crowds and shades out
r vegetation and clears the ground. The crowns
not very inflammable, so that they check the
ad of fire. And such fire guards have certain advan-
s over cleared fire lines; they keep the land pro-
ive and they do not require constant renewal.
fire guards have been used successfully in Tunis,
rding to M. Lavauden. The species recommended
E. marginata, meliodora, obliqua, leucoxylon,
hypoda, for dry rocky soil, and E. doratoxylon and
osa for sandy soil.

Ontario Helps Counties to Establish Forests

In each of six counties in Ontario at least 1,000 acres of waste land owned by the county is being reforested by the provincial government. Any county purchasing 1,000 acres or more of suitable land for the purpose has the privilege of having the land planted and managed for 30 years by the provincial department of forestry. At the end of that period the county will have the option of resuming control of the property on payment of what the Province has spent on it, without interest; relinquishing claim to the property and receiving the purchase price from the Province, without interest; or sharing equally with the Province in the forest's management costs and earnings.

To encourage the establishment of demonstration plantings the Ontario government not only supplies free planting stock but does the planting for any municipality purchasing and fencing a small piece of land suitable for this purpose. More than 50 such plots have now been established.

For private reforestation work the provincial government offers any individual planter 3,500 trees a year without charge, the planter paying the expense of transportation. Besides this allowance 500 spruce and cedar are furnished to any resident for windbreak planting. Additional quantities of trees are supplied at $4 a thousand.

Success with Douglas Fir in Belgium

Excellent results have been obtained from the planting of Douglas fir seed in arboreta of the Belgian Government, especially at Groenendael, and Douglas firs are being planted in Belgium in larger numbers every year, according to information reaching the United States Forest Service from the Belgian Director General of Forests and Waters. In the spring of 1929 a considerable area in the neighborhood of Vielsalm in the Ardennes is to be planted with several hundred thousand Douglas firs, some of which were grown from seed produced by firs planted at Groenendael 30 years ago. Small quantities of seed of Douglas fir and of other tree species native to the western part of the United States are being supplied to the Belgian Government by the United States Forest Service.

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Under the administration of Francisco Salazar as chief of the forest service of Mexico the first lookout tower in that country has been erected in the Chihuahua Mountains. This is a wooden tower more than 100 feet high. With the cooperation of Daniel Galicia, a private forester, Mr. Salazar plans to build several lookout towers on the mountain tops surrounding Mexico City.

Forest Fire Protection in Java

When the easterly monsoon is blowing over Java, from June to September, the lower foothills and upper coastal plains of the eastern third of the island are directly down wind from the great central desert of Australia. It is precisely in this driest section that the governmental teak forests are concentrated, writes Coert du Bois, United States consul general in Java, who is a former member of the United States Forest Service.

In Java teak sheds its leaves about the middle of August. The leaves are very large, on young trees and sprouts sometimes reaching the size of 18 by 9 inches; thus the resulting leaf litter is heavy. By September 1 this litter has dried out to a degree that invites fire, and before the first rains come it has about two months in which to dry out still further. A postponement of the rains till December 1 sets the stage for disastrous fires. An important factor in the fire hazard is the density of the population; with an area of 131,440 square kilometers (the kilometer is less than five-eighths of a mile), Java and the small neighboring island of Madoera have a population of nearly 36,000,000. On the average, about 5,000 fires are to be expected each year.

An ordinary surface fire in teak kills the young plants up to 1½ inches in diameter and damages the butts of older trees. Repeated fires result in loss of humus, decreased rate or complete stoppage of growth, erosion on hilly land, and occupation of the forest floor by "alang alang," a coarse, worthless grass (*Imperata* sp.), that is hard to eradicate and that is itself very inflammable. In new plantations a surface fire kills the young trees to the ground. They may or may not sprout, and often the whole burned area has to be replanted.

Early in the year, in preparation for the dry monsoon season, the Dutch foresters in charge of the 7,654 square kilometers of teak forest prepare plans covering the distribution of the laborers in the felling and planting areas with reference to their use as fire fighters. Each crew of woods laborers is instructed that in case of fire all other duties give way to fire fighting, and is made responsible for the protection of a certain area. In an emergency, a call for help in fighting fire is sent to the villages of the natives. In certain districts, if no fire occurs during the dry monsoon within a specified area adjacent to a village the Dutch authorities reward the village with a slamatan or native feast when the rains have started.

Roads, trails, and forest tramways are kept cleared so as to serve as firebreaks. On certain units regular firebreaks are laid out and cleaned on the windward side of areas needing special protection.

The organized detection service includes patrols, and lookouts on fixed points. There is no telephone system, but the Dutch foresters have taken advantage of a native method of signalling by means of a hollow v cylinder 1 to 1½ meters long with a vertical slit in one side. This is sounded by striking it wi hardwood bar. The sound, although not loud, great carrying power. One of these wood signal dr hangs in the alun-alun or gathering place of every na village. Above the platform of each of the lool towers, which are made of bamboo, is suspended of these native drums. The lookout signals the l tion of smoke to the fire guards and to the surroun villages by code, using a system of strokes and i vals that has been worked out and practiced in adva

In the period 1923–1927, inclusive, the proportio the teak forest burned over averaged 4.64 per ce year, and the cost of protection averaged 19.2 c Dutch (7.68 cents in United States currency). ' represents protection of a considerably higher de of intensiveness than that practiced on the nati forests of the United States, Mr. Du Bois rema the costs are practically all labor costs, and unlim forest labor is available at from 50 to 80 cents Dut day. A forest guard can be hired in the Java forests for the equivalent of $7.20 U. S. a month.

In addition to the teak forests Java contains tro hardwood forests covering 24,171 square kilome or 25 per cent of its area. The mass of these is loc on the comparatively short, steep southern slope of island, the Indian Ocean side. The jungle fore essentially an evergreen forest, containing only a deciduous species. The humus is deep and the li heavy; but on account of the perennial overhead sh and the higher altitude it is only near the close of dry monsoon, or when the dry season is unusu prolonged, that the jungle dries out sufficiently present a real fire hazard. Intensive protection m ures are not carried out on these forests.

Nearly Three-Quarters of New Zealan Forest Land Is Government Owned

In the islands forming the Dominion of New Zeal nearly 1 square mile in 5 is forest land. New Zeal forests that are economically exploitable at the pre time have a total area of 5,646 square miles, officia the Dominion reported at the British Empire Fore Conference of 1928; protection forests and cut-over a dedicated to forest conservation total 14,919 sq miles. The volume of standing timber is estimate 3,097.8 million cubic feet for conifers and 2,9 million cubic feet for broad-leaved species. The S owns 72 per cent of the forest land, corporate bodies 17.6 per cent, and private individuals own 10.4 per c

Native wood consumed and exported amount 68,000,000 cubic feet yearly, forestry officials estim Timber exports are set at 7,400,000 cubic feet, imp at 8,700,000 cubic feet.

The results of recent investigations tend to indi that in most of the forests of the Dominion, bec overmaturity of the timber, loss by decay balances e increment. The loss by fire is practically negligible. th the possible exception of kauri and beech species, ry little hope is entertained of the regeneration of e indigenous forests either naturally or by artificial eans. The podocarp forests, which regenerate rough a cycle of plant succession, present special mplications.

The New Zealand Government has increased its arly plantings of exotic forest species from less than 00 acres in the fiscal year 1923 to 35,000 acres in e fiscal year 1928. In these plantings very satis- tory results have been obtained with direct seeding, ecially with spot sowing. Considerable reductions the cost of raising seedlings have been brought about the adoption of line sowing, and most of the species ed are now raised in this way.

Monterey pine and Douglas fir are the principal ecies in these plantings. Other species used are nus ponderosa, Pinus laricio, and redwood.

By an act of 1927, 63,578 acres of State forest was sted in the Wellington city council for watershed otection and forestry purposes. This area, providing otection for the water supply of Wellington and jacent boroughs, is controlled by a board consisting four members of the city council and five repre- tatives of the adjacent local authorities, with the ayor of Wellington as chairman. The act provides the development of the area under the supervision a competent forest officer and according to a working an approved by the commissioner of State forests.

NOTE.—A discussion of commercial forest planting New Zealand appeared in the January, 1929, number the FOREST WORKER.

French Law Regulates Cutting of Chestnut

A law passed recently by the Parliament of France provides that any owner or operator desiring to cut more than 20 chestnut trees during the year must make a declaration in writing to the prefect of the department at least a month in advance. The declaration must indicate the place where the cutting is to be done, the number of trees to be cut, and whether the "ink disease" exists in the stand. Cuttings in coppice need not be declared. Every tree cut must be replaced, either by a sprout or by a planted tree, within two years. The pasturing of goats is forbidden for three years on lands on which reproduction is being established, except where the ink disease is present. Subsidies in cash and planting stock are provided for encouraging the establishment of chestnut in places where it seems desirable to encourage the growing of this species. A penalty of 50 to 500 francs is provided for failure to observe the regulation in regard to replacement of chestnut that is cut and of 5 to 10 francs for allowing grazing on the forbidden areas.

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The Minister of Agriculture of Sweden has been authorized by the King in Council to appoint a committee of five for the purpose of investigating possibilities of converting into forest suitable ground that is not yet subjected to rational utilization. The committee will be required to submit a plan toward the realization of this purpose, indicating the extent of Government aid required.

Personals

Stephen T. Mather has resigned as director of the ational Park Service because of illness. Mr. Mather tered the Department of the Interior in 1915 as sistant to the Secretary in charge of national parks, d has been Director of the National Park Service er since the bureau was created in 1917. The new rector of the service is Horace M. Albright, who has rved since 1919 as superintendent of Yellowstone ational Park and field assistant to the director. Mr. lbright first entered the department in 1913 as assist- t attorney, was assigned to Mr. Mather as assistant d legal advisor in 1915, and was the first assistant rector of the National Park Service.

Roger W. Toll, formerly superintendent of Rocky ountain National Park, Colo., has succeeded to the perintendency of the Yellowstone.

John W. Spencer has been made assistant district forester of the Rocky Mountain National Forest District in charge of lands, succeeding Earl W. Tinker, now district forester of the Lake States National Forest District. A reorganization of the Denver office makes Mr. Spencer responsible also for the public relations work formerly handled by H. D. Cochran, who now holds Mr. Spencer's former position as assistant to the district forester in charge of forest management.

Officers elected by the Massachusetts Forestry Association at its thirty-first annual meeting are president, Harvey N. Shepard, Boston; secretary, Harris L. Reynolds, Belmont; treasurer, Ernest B. Dane, Brookline; executive committee, John S. Ames and Harry F. Gould.

Announcement is made by the Secretary of Agriculture of the formation of the Allegheny Forest Research Advisory Council, consisting of 18 residents of the Middle Atlantic States. The council will advise the Department of Agriculture as to a forest-research program to be followed by the department in that group of States; and within its region will endeavor to stimulate forest research on the part of all suitable agencies, to correlate all forest research so far as possible, and to further the advance of forestry practice. Those appointed to membership on the council are as follows: Charles P. Wilber, State forester, Trenton, N. J.; B. L. Livingston, Johns Hopkins University, Baltimore, Md.; O. E. Jennings, curator of botany, Carnegie Museum, Pittsburgh, Pa.; Henry W. Leeds, Haddon Hall, Atlantic City, N. J.; Jacob G. Lipman, director, New Jersey Agricultural Experiment Station, New Brunswick, N. J.; Philip S. Collins, vice president and treasurer, Curtis Publishing Co., Philadelphia, Pa.; A. J. Musser, general manager, Clearfield Bituminous Coal Corporation, Indiana, Pa.; E. C. M. Richards, Mount Carbon, Pottsville, Pa.; F. F. Nicola, Schenley Farms Co., Pittsburgh, Pa.; B. F. Tillson, general superintendent, New Jersey Zinc Co., Franklin, N. J.; Rodney H. True, department of botany, University of Pennsylvania, Philadelphia, Pa.; De Courcy W. Thom, Maryland Trust Building, Baltimore, Md.; Alexander R. Wheeler, Wheeler & Dusenbury Lumber Co., Endeavor, Pa.; Joseph W. Illick, State forester, Harrisburg, Pa.; J. A. Ferguson, department of forestry, Pennsylvania State College, State College, Pa.; H. H. Holzapfel, general manager, Potomac Edison Co., Hagerstown, Md.; George W. Butz, Butz Lumber Co., Wilmington, Del.; and F. W. Besley, State forester, Baltimore, Md.

Members reappointed to the California Forest Research Advisory Council for 3-year terms are Swift Berry, F. H. Fowler, B. A. McAllaster, E. W. Murphy, and Spence D. Turner.

W. B. Lewis, formerly superintendent of Yosemite National Park, is the newly appointed assistant to the director of the National Park Service. C. G. Thomson has been transferred from the superintendency of Crater Lake National Park, Oreg., to Mr. Lewis's former post. Mr. Thomson's successor is Elbert C. Solinsky, formerly assistant to the superintendent of Yosemite National Park.

E. Phillips-Turner has succeeded L. MacIntosh Ellis as director of forestry for New Zealand. Mr. Phillips-Turner has had long experience in New Zealand forestry.

Alfred A. Doppel has resigned as district forester on the Eastern Shore of Maryland, to accept the position of forester with the Chamber of Commerce of the United States, Washington, D. C.

Paul V. Siggers has joined the Bureau of Pl Industry as forest pathologist and has been statio at the Southern Forest Experiment Station. Siggers is a member of the 1914 forestry class of University of Michigan who has had several ye experience in Costa Rica, Honduras, and Cuba w the United Fruit Co. and the Standard Fruit & Stea ship Co.

W. L. Gooch has resigned as district forester for Tidewater district of Virginia, and has taken a posit as forester with the Hummel-Ross Fibre Corporati a pulp-manufacturing company of Hopewell, Va. place has been taken by George W. Dean, a gradu of the Pennsylvania State Forest School and of Yale Forest School who has had experience on Natural Bridge and Ouachita National Forests.

R. M. Volkert has been employed by the Gr Southern Lumber Co., Bogalusa, La., as special r wood representative. He will engage principally developing new uses for redwood in the North a East. Mr. Volkert was a member of the staff of Forest Products Laboratory, Madison, Wis., for 4-year period ending in 1925, and at that time mad study of the characteristics and uses of commer woods, especially redwood. He has since been c nected with the Union Lumber Co., Fort Bra Calif., in sales promotion and market developm work in the Atlantic Coast region.

L. I. Barrett, junior forester at the Southern For Experiment Station, has been transferred to Central States Forest Experiment Station. place is being filled by the transfer of Roy A. Chapm from timber reconnaissance work in the Rocky Mo tain National Forest District.

Ellwood S. Harrar, who received the B. S. deg from the New York State College of Forestry in 1 and the M. S. degree from the same institution in 19 is now an instructor in wood technology and w utilization in the College of Forestry, University Washington.

John C. Sammi has joined the faculty of the N York State College of Forestry, at Syracuse Univers as instructor in forest engineering. Mr. Sammi i forestry graduate of the University of California. has had experience in national forest timber sales w in California, and more recently has been carrying research work for the University of California in redwood forests.

Officers elected by the Pennsylvania Forestry sociation to serve during the present year are preside Samuel L. Smedley; president emeritus, Dr. Henry Drinker; secretary and treasurer, F. L. Bitler.

Bibliography

A Book on the Woody Plants of Alabama

By W. A. Dayton, United States Forest Service

treatise on the woody plants of Alabama by the
grapher of that State, Roland M. Harper, has re-
tly been issued by the Geological Survey of Ala-
na under the title "Catalogue of the Trees, Shrubs,
Vines of Alabama, with Their Economic Proper-
and Local Distribution." Doctor Harper is well
wn to foresters and to the scientific world in gen-
as an informing and prolific writer on botanical,
cultural, sociological, and statistical subjects. This
er-bound book of 357 pages includes no keys, and
descriptions it gives are very brief; thus the work
n no sense a manual for identification purposes.
ef emphasis is placed on the distribution and eco-
nic notes which, naturally enough, are especially
in the case of the timber species. Frequent refer-
e is made to work done in Alabama or with Ala-
na timber species by individual foresters. With
text are included 66 halftone illustrations of the
etation; 23 line maps showing soils, ecology, me-
rology, and vegetative distribution; a bibliography;
an index. Well-calendered paper has been used,
the typography is very good. To those interested
he ecology or economics of Alabama woody plants
work is invaluable.

This book is Part 2 of the Economic Botany of Ala-
na, of which Part 1, Geographical Report, by the
ne author, was published by the Alabama Geological
vey in 1913. It may be obtained by sending 15
ts in stamps to Walter B. Jones, State Geologist,
iversity, Ala.

dex for Society of American Foresters Organs

A classified index to the Forestry Quarterly and the
oceedings of the Society of American Foresters from
ir first publication in 1902 and 1905, respectively,
il their amalgamation as the Journal of Forestry,
l to the Journal of Forestry from its beginning to
l including 1926, has been prepared and issued in
neographed form by the Forest Service, Depart-
nt of the Interior, Canada. The plan followed in
exing the material is the outline for the classification of forestry literature approved by the committee on forestry education of the Society of American Foresters and published in the Journal of Forestry, February, 1923, pages 148-161. The standard classification subdivision has been abridged to the first decimal place.

A Bulletin on Forest Insurance

By W. N. Sparhawk, United States Forest Service

Forest Insurance and Its Application in Michigan, by Paul A. Herbert (Michigan State College Special Bulletin 179, 1928) presents an interesting discussion of the theory, objectives, and possible organization of forest fire insurance, including details as to methods of rating risks and appraising values, with special reference to Michigan. It is pointed out that "Michigan's forests are exposed to a very serious fire hazard and much must still be done * * * to lower the hazard to a reasonable level." The few stock companies writing forest insurance in the United States have had to charge such high rates that the volume of business has remained small. The author expresses doubts as to the feasibility of mutual or voluntary governmental insurance, and appears to favor compulsory governmental insurance under Federal auspices as probably the cheapest and most effective. It is estimated that average Michigan forests can be insured at rates ranging from about 90 cents per $100 for hardwoods to about $1.15 per $100 for jack pine. The assertion that insurance will be taken out on the more hazardous forests first may be questioned, for it is admitted that European experience has shown insurance to be necessary not only where the hazard is high but also where it is low.

Valuation of forest property for insurance purposes is a particularly difficult problem in the case of immature timber, because insurance is usually based on sales value, and the sales value of young growth is much below its true or expectation value. It is suggested that replacement value be used for stands below one-third the rotation age, and average sales value for older stands.

It is doubtless true that, as Professor Herbert predicts, lower rates and a greater demand for forest insurance will come with better fire protection and higher stumpage values. He might have added "and with a serious intention on the part of a large number of owners to utilize their land for timber growing."

Climatic Cycles and Tree Growth

By G. A. Pearson, United States Forest Service

A. E. Douglass's investigations of tree growth in relation to cycles of rainfall have great interest for foresters because of their promise of a means of long-range weather forecasting. His early investigations, the results of which he reported in a series of publications dating from 1909, pointed to more or less definite cycles in the occurrence of wide and narrow growth rings and to a correspondence of these cycles with variations in rainfall as shown by the available records of precipitation. Confirmation of such periodicity and correlation would make it possible to read climatic history in cross-sections of tree trunks and, by projecting established cycles into the future, to predict the coming of wet and dry periods. The present work, based upon a greatly increased volume of tree material collected over a wide range of territory, tends to corroborate and amplify the earlier findings.

The author describes in considerable detail his methods of collecting material and technique of measuring, recording, and analyzing the widths of annual rings. Due consideration is given to the many factors other than the climatic that may temporarily retard growth, such as competition, disease, insect injury, and fire. To a certain degree these factors are automatically taken into account; for the measurements are made on large and very old trees which, in order to attain such size and age, must have been dominant and relatively free from disturbing influences. Two instruments called the "plotting micrometer" and the "longitudinal plotter" transfer the ring records, on a magnified scale, to a strip of paper, in order to facilitate accurate measurement and analysis. A third instrument called the "cyclograph" is employed to detect periodicity in the occurrence of maxima in graphs of annual diameter growth.

Radial sections of western yellow pine from 10 western mountain States were studied. Individual trees in a given locality were found to correspond closely in periodicity, but trees of different regions were often found not to correspond. Comparison of smoothed curves revealed three western regions within which the curves are homogeneous. These are the Pacific coast region, centering in the Sierra Nevada; the Arizona region, centering in Flagstaff; and the Rocky Mountain region, centering in Pikes Peak. Cycles of 11 and 14 years appear to dominate on the coast, cycles of 14 and 21 years in Arizona, and cycles of 10 and 11 (or 23) years in the Rocky Mountains. When curves were plotted for points between these three regions, mixed effects were obtained.

The Flagstaff tree record, extending from 1300 to 1925, shows in addition to the 14 and 21 year cycles an 11.3-year cycle, interrupted from 1630 to 1850, that corresponds with the known sun-spot record. This cycle appears also, with interruptions, in the Sequ
record, which extends back to 300 B. C. For certa
periods Flagstaff trees show also a 7 and a 9.4 ye
cycle. Growth maxima, and presumably rainf
maxima, correspond with sun-spot minima. The d
years in the Flagstaff record analyze best on 14 a
21 year cycles, with major droughts at intervals
about 150 years and minor droughts at intervals
40 or 50 years. In the Flagstaff area the projecti
of cycles observed to have occurred in the past 2
years would indicate large growth of trees in the 193
and 1950's, with depressions in the early and late 1940

It should be explained that much remains to
learned about climatic cycles before the desired app
cation of these studies becomes possible. If the preci
tation curve rises and falls in regular waves, as ma
have assumed that it does, all should be simple. B
it seems that the curve is far from regular. Instead
a single cycle operating uniformly through centuries,
appears that there are cycles of 7, 9, 11, 14, and
years, each operating with varying intensity. Som
times two or more cycles may coincide with exagge
ated effect, and again they may partially or whol
neutralize each other. Before the observations th
far made in this field can be applied in long-ran
weather forecasting, more must be learned about t
causes behind each cycle.

(A. E. Douglass: Climatic Cycles and Tree Growt
Vol. II. A Study of Annual Rings of Trees in Relati
to Climate and Solar Activity. Carnegie Instituti
of Washington, 1928.)

Vermont's Forest Industries

By W. N. Sparhawk, United States Forest Service

A recent publication, prepared jointly by the
mont Forest Service and the office of blister rust co
trol of the United States Bureau of Plant Industr
gives a bird's-eye view of the rate of utilization
Vermont's forests. It shows that nearly two-thir
of the State is forest land (3,427,418 acres, agai
2,792,000 acres estimated for the 1920 report by t
United States Forest Service known as the Capp
report) and that almost two-thirds of the forest
hardwood and only 10 per cent white pine, either pu
or mixed with hardwoods. The average annual cut
lumber for 1924–1926, which is shown by counties a
by kinds of wood, is put at 180,000,000 feet. T
is considerably larger than the cut shown for the sa
years by the Census (122,000,000 feet) partly because
includes 43,000,000 feet used directly by wood-wor
ing factories. Of the 361 sawmills reporting, o
50 were portables; but 133 of the stationary mi
were run by water power. Only 102 mills cut m
than 500,000 feet, the average cut for stationa
mills being 341,000 and that for portables 620,0
feet. Statistics of consumption include the logs a

er utilized by wood-using industries, classified ecies and by counties. There are brief discus- of the requirements of individual industries, lirectories of wood-using factories and sawmills. terest is the statement that "practically all of vhite pine for pattern stock and shade rollers from outside the State. This is because white of a quality such as is demanded for these pur- can not be found in sufficient quantity in Ver- "

bert M. Ross and Perry H. Merrill: Annual Cut, umption, and Value of Forest Products in Ver- pp. 47. Vermont Forestry Publication 32,)

wth of Eucalypts in the Transvaal

By Perkins Coville, United States Forest Service

lletin No. 21 of the Forest Department of the of South Africa brings together data on the h and behavior of eucalypts in the high-lying mid and humid portions of the south central outheastern Transvaal. This area has an ele- for the most part of approximately 5,000 feet re, and is subject to a mean annual temperature en 55° and 62° F. Mean annual rainfall ranges ferent localities from about 25 inches to nearly 70 s.

calypts were planted in this region at least as as 1890. Since that time the Government and n mining companies have established plantations ious species, and year after year private individuals unicipalities have followed their lead. Eucalypts rown on farms as shelter belts and as woodlands e production of firewood, poles, and fencing l, and are grown in plantations by farmers others for commercial purposes—at present, pally for the production of props, lagging, and r for use in mines.

e climate of the region is temperate, since altitude s the low latitude. Rainfall is confined almost ly to the summer, which begins in October and till March. Summer temperatures seldom exceed . Severe frosts occur nearly everywhere in the , and limit very appreciably the choice of eucalypt s for propagation. Other adverse conditions are ly cold winter winds from the south, dry desic- west winds occurring toward the end of winter the spring, and frequent droughts in spring and summer.

e bulletin discusses the geology and soils of the at some length and delimits three silvicultural , describing each with considerable detail as to te and soil. For each zone histories are given of s with eucalypt plantations and recommendations ade as to the choice of species for planting. These mendations vary according to soil type, mth" of site, soil moisture, and soil depth. Next 65 species of eucalypts are listed with notes on such characteristics as drought resistance, soil requirements, hardiness, rate of growth, stem form, and quality of wood. In all but a few cases these notes are based on actual experience in planting the species in the area under discussion.

It is recorded of E. viminalis that an 18-year-old plantation at the Jessievale arboretum, after a thinning that left 134 trees per acre, had an average height of 104 feet and an average diameter of 13.7 inches. This species, however, is one of several that, after being planted extensively in the area, can not be recommended for further planting there at present because they are very severely attacked by the snout beetle. One popular species, E. rostrata, has shown variable results leading to the recognition of distinct strains. E. globulus, which has been tried out to some extent in the United States, has been widely tried out in one zone of the Transvaal, but suffers from drought and frost.

The bulletin closes with silvicultural observations upon such topics as selection of site and species, soil preparation, and "espacements." Thinnings, rotations, and yield are briefly discussed.

An appendix contains a table classifying eucalypt species as to susceptibility to snout beetle attack, a map of the Transvaal showing the three silvicultural zones defined in the text, and 13 illustrations of eucalypt stands or individuals.

This bulletin is comprehensive, is technically and editorially well done, and should prove of distinct value to anyone interested in planting and growing eucalypts in the Transvaal or elsewhere.

(J. J. Kotzé and C. S. Hubbard: The Growth of Eucalyptus on the High Veld and Southeastern Mountain Veld of the Transvaal. 59 pp. il., map. Government Printing and Stationery Office, Pretoria, 1928.)

Rocky Mountain Planting Report Available

The 1928 planting report for the Rocky Mountain National Forest District was recently issued by the Denver office of the United States Forest Service. This report covers both nursery and planting work done during the year on the national forests in Colorado, Nebraska, South Dakota, Wyoming, Michigan, and Minnesota. These are the forests on which the Forest Service does more than half its planting. The report contains full discussion of the planting developments of the year, tables of nursery stock and areas planted, and plans for the next five years' work. It does not deal with planting prior to 1928.

This report is available to the forest schools at the cost of making copies. Requests for it should be addressed to the District Forester, United States Forest Service, Denver, Colo.

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ern Division of the Apache; ½-inch, Ashland
sion of the Custer, Ozark, San Juan; ¼-inch, I
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FOREST WORKER

ashington, D. C. MAY, 1929 Vol. 5, No. 3

State Forestry

Two New York Forestry Laws Approved Unanimously

By **Paul D. Kelleter**, New York State College of Forestry

Unanimous action by the legislature, promptly lowed with approval by Governor Franklin D. osevelt, gives a unique distinction to two new for- ry laws of the State of New York. The measures ve emerged triumphantly from the vicissitudes of legislative and political mill at Albany without a gle voice having been raised against them either in nmittee hearings or on the floor of the senate or embly.

Following recommendations made by the investi- ory forestry commission organized in 1928, the ite has taken steps to encourage the establishing of inty forests and has adopted the policy of State quisition of lands suitable for reforestation in coun- s other than the forest-preserve counties.

The county forest law authorizes each county to quire land, reforest it, and maintain the forest wth for the protection of watersheds and to pro- ce timber and other forest products, and provides the State will make contributions for this pur- se of not more than $5,000 annually to each county. obtain the subsidy from the State the individual inty must certify its own appropriation for this rpose and its previous reforestation expenditures, d above all must submit in detail its proposed plan forest management. The conservation commis- ner will have the responsibility of deciding whether plan submitted meets the purposes of the law. he certifies that he is satisfied, payment will be made the county. Trees will be furnished by the con- vation department without charge except for insportation.

In the law authorizing the establishment of State ests in counties other than the forest-preserve inties, for administrative reasons the authoriza- n is limited to projects covering continuous areas at least 500 acres.

The Empire State has more than 5,000,000 acres of e land. Since 1880 New York farm lands have en abandoned at the rate of about 250,000 acres nually. It is expected that these two laws (further tails in regard to which were given in the March number of the Forest Worker) will have a significant part in bringing about the rehabilitation of this vast area, which at present is shifting its burden of taxes to other lands ill suited to bear the additional load.

The forestry commission has been continued another year. The expectation is that it will next take up the question of taxation of forest lands. A forest tax law was enacted in New York three years ago, but there has not been any general move by landowners to bring their land under its provisions. Study is needed to ascertain the reason for this law's lack of popularity.

Increased Appropriation for South Carolina Forestry

An appropriation of $12,500 has been made by the South Carolina Legislature for State forestry work in the calendar year 1929. The appropriation made for this work in the preceding year was $4,000. State Forester Staley expects that funds added by private cooperators to State and Federal funds for forest fire protection work in the State in the year beginning July 1, 1929, will bring the total available for that purpose to a little more than $50,000.

West Virginia Game, Fish, and Forestry Commission

Under the terms of a law effective July 1, 1929, the West Virginia Game and Fish Commission will become the West Virginia Game, Fish, and Forestry Commission. The law provides for the appointment by the commission of a chief forester, who must be a graduate of a reputable college or university with technical forestry training and practical experience in forestry. The forestry division, headed by the chief forester, will be on a parity with the game and fish division, headed by the chief game protector. Authority is given to the commission to purchase land suitable for State forests and forest parks. Other provisions of the law lay new restrictions on hunting in the State, under one of which deer are to be protected for the next five years in Mingo, Marion, Marshal, and Mercer Counties, and give the commission discretionary powers to modify the dates for the opening and closing of hunting seasons and to change bag limits.

New Idaho Forestry Legislation

Under the new reforestation law of Idaho cut-over or burned-over forest lands that have no commercial timber on them, that are chiefly valuable for producing commercial forest crops, and that are set aside by the owners for reforestation, may be assessed for taxation purposes at $1 an acre. When the timber crops are harvested, a yield tax of 12½ per cent of the stumpage value is to be assessed. Administration of the law is intrusted to the State cooperative board of forestry. If lands brought under the provisions of the law are found to be usable for grazing or other purposes not detrimental to reforestation, the additional value is to be assessed for taxation by the State board of equalization.

Forest-protection districts already established in the State, or hereafter to be established, under the Idaho forestry act of 1925, are designated under this law as "reforestation districts" within which the provisions of the law apply. Persons wishing to have their lands designated as "reforestation lands" are to petition the State cooperative board of forestry for such designation, affirming that they believe the lands chiefly valuable for growing forests and agreeing, among other things, that they will comply with the board's rules and regulations for the care and development of commercial forests and pay their proper share of the cost of fire protection. The board is to grant or refuse the petitions on the basis of the statements made in them and of evidence brought out at public hearings.

The designation of lands as reforestation lands may be canceled by the board if it is found that the owner is not complying in good faith with the provisions of the act, or if it is found that commercial timber was present on the lands at the time of the owner's petition. When a cancellation is made, any difference between the taxes that have been paid and those that should have been paid under the general tax laws will be collectible, and in cases involving the presence of commercial timber 10 per cent interest will be due on the difference. If through changing conditions lands designated as reforestation lands become more valuable for other purposes than for reforestation they may be excluded, "provided that the owner thereof shall be required as a condition precedent to the entry of said order of exclusion" to pay any difference between the tax paid on the lands and timber under the provisions of this act and the tax that would have been paid under the general laws of the State.

Owners of reforestation lands are forbidden to permit grazing on them or use them for any other purpose except under rules and regulations adopted by the board.

Thirty days' notice of intention is required before any timber is cut on reforestation lands for other than domestic purposes, and before the cutting the owner must give bond that the yield tax will be promptly paid when due. In January of each year owners of reforestation lands will be required to report to t
board and to the county assessor the amount of a
forest crop cut during the preceding calendar ye
The yield tax will then become payable to the coun
treasurer on the basis of full current stumpage val
at the time of cutting as determined by the boa
Forest materials cut for the domestic use of the own
of the lands will be exempt from taxation. The yie
tax will become delinquent if not paid on or before t
1st day of June following. It will become a lien agai
lands, the forest materials cut from them, and any oth
real or personal property of the owner within the count
The lien may be enforced in the same manner as oth
delinquent taxes, and collected under the general t
laws of the State.

Yield taxes will be placed in the general fund of t
county.

Lands covered with commercial timber at the time
the passage of the act will be eligible for designation
reforestation lands when the commercial timber h
been cut and removed only if the operation is carri
out in compliance with the laws of the State, and
young and immature timber is left as prescribed by t
board and is given the greatest practicable protecti
from logging injury.

The designation of lands as reforestation lands is n
to affect the right of the public to camp, hunt, and fi
on them.

The passage of this act, the verified petition of t
owner, and the making and filing of the designati
order by the State cooperative board of forestry w
be held to constitute a contract between the Sta
of Idaho and the owner, running for a period of
years. No change in or repeal of the act will apply
land that has been designated as reforestation la
except as the board and the owner may agree. At t
expiration of 50 years the contract may be renewed
mutual consent of the owner and the board. If t
contract is not renewed, the merchantable timber
the lands is to be estimated by a cruiser agreed up
by the board and the owner, or, if they fail to agree,
a committee of three cruisers of whom one is to
selected by the landowner, one by the board, and
third by these two. Cruising expenses will be bor
equally by the owner and the State. The yield t
will then become due as if the timber had been cut.

Any purchaser of reforestation land, other than t
State or Federal Government, will take the land su
ject to all the provision of the act.

An act amending the Idaho forestry law of 19
establishes the injunction as an additional remedy f
violation of the law's requirements as to slash dispos
It makes violation of any of the provisions of this la
in regard to slash disposal or the clearing of rig
of way and clearing around logging donkeys, cam
and buildings on any legal subdivision a separate
fense punishable by fine, and reduces the minimum fi
for such an offense (formerly $100) to $50. It a
makes violation of any of the provisions of the law

egard to setting fires during the closed season punishble by a fine of not more than $1,000 or by imprisonent in the county jail for not more than 6 months r by both such fine and imprisonment.

Wisconsin Interim Committee Report on Forestry and Public Lands

In the report of the interim committee on forestry nd public lands to the Wisconsin Legislature, issued n March, a comprehensive program is proposed for andling the forest lands in the State. This program ncludes provision for Federal, State, county, and comnunity forests, for encouragement of forestry on priate lands, for forest fire protection, and for forest esearch.

The unique feature of this program is the importance t gives to county forests. In Wisconsin tax-delinuent lands revert to the counties; and for this reason he committee sees the county as the chief governnental unit around which the program of public forstry in the State must be built. It is therefore recommended that the counties be encouraged to take itle to delinquent forest lands and that they be llowed to enter such lands under the forest crop law of the State without paying the 10 cents acreage tax ssessed against private owners. It is also recomnended that the counties be empowered to control levelopment by zoning, setting aside for forest and ecreation purposes lands on which settlement is parse, tax delinquency heavy, and abandoned farms numerous. This zoning authority would carry with it he right to bring isolated settlers into agricultural zones by exchanging lands with them. In order that he county forests may have the best technical care the mmittee recommends the adoption of a plan under which the conservation commission would cooperate with county authorities in selecting land for development as county forests and in improving and caring or such land.

The recommended program for county forests grows out of the tax-delinquency situation, which is particuarly serious in northern Wisconsin. In the 17 northern ounties 2,500,000 acres were tax delinquent in 1927. As one method of checking the tendency of tax delinquency to feed upon itself the committee recommends hat tax delinquent lands be tied up for 50 years by entry under the forest crop law.

In order to encourage selective logging the committee recommends the repeal of the section of the orest crop law that prohibits entry of lands bearing ommercial timber. Several other amendments to the orest crop law are proposed, the chief of which would ermit counties and other local government units to enter forests under the law with exemption from payment of the owner's acreage tax of 10 cents but subject o the yield tax of 10 per cent.

The committee recommends that encouragement be given to private forestry, in addition to that provided in the forest crop law, by extending the State's nursery facilities and by amending the State income tax laws so as to permit private owners who are engaged in planting to capitalize their expenditures on planting or to charge them to operating expense each year.

In view of the fact that there are in Wisconsin about 18,000,000 acres of land requiring forest management, the committee recommends that the limit of Federal acquisition for national forest purposes in the State be increased from 500,000 acres to 750,000 acres. It recommends also that efforts be made to block up State forest lands by exchange, sale, and purchase, and that strips of timberland along highways be acquired by the State.

As fundamental to the success of all other plans for handling the forestry problem in the State, the committee recommends the extension of the forest protection system and the immediate appointment of a State fire warden under the direction of the State forester.

In preparing to make its report the committee studied the situation not only in Wisconsin but in the neighboring States of Michigan and Minnesota, and also visited Pennsylvania, Massachusetts, and New York to observe the methods by which those States are handling their forestry problems.

Estimates submitted by the committee indicate that the total stand of merchantable timber in Wisconsin amounts to about twelve and one-half billion board feet. Without regard for possible growth in the meantime it is calculated that this timber supply is insufficient to last the wood-using industries of the State longer than about 12 years.

Action on New Hampshire Taxation Bills Deferred

Action on taxation bills introduced in the New Hampshire Legislature, including bills proposing that a tax assessed on timber at the time of cutting be substituted for annual taxes on growing timber and that the towns be reimbursed by the State for resulting loss in revenue, has been deferred until the next session of the legislature. At the request of Governor Tobey the senate adopted a resolution referring to the next legislature the tax-revision program that has been drawn up by a recess commission of the legislature created for that purpose. The object in deferring action is to obtain in advance an opinion of the State supreme court as to the constitutionality of the bills included in this program, and such an opinion is required of the court under the terms of the senate resolution. The governor has proposed that in case of an adverse decision by the court a constitutional convention be called in 1930. The next session of the legislature will take place in 1931.

Louisiana Hardwood Lands Offer Exceptional Opportunities for Timber Growing

By G. H. Lentz, New York State College of Forestry

In the hardwood bottom lands of Louisiana moist conditions have not prevented severe injury to timber by fire. After spending most of last year in the Louisiana hardwood forests as a special investigator for the State division of forestry I am uncertain, in fact, as to whether the final loss from fire has not been greater in the hardwood stands than in the pine woods of the State. In the warm, humid conditions prevailing in the Louisiana bottom lands hardwoods injured by fire are readily attacked by fungi, which cause butt rot. In the bottom lands north of the Red River from 80 to 90 per cent of the hardwood stands were burned over in 1916 or 1924–25, or in both those periods. Evidences of fire as far back as 1860 or thereabouts were noted. In the parishes south of the Red River and those east of the Mississippi evidence of fire injury is present but is less pronounced. Detailed study on a logging operation in a red-gum flat where fires had occurred in 1916 and again in 1924 showed that the loss in merchantable timber due to fire and decay amounted to about 15 per cent of the stand.

During 1928 about 80 mills with an individual daily output of 30,000 board feet or more were operating in the hardwood region of Louisiana. Visits to 60 of the mills elicited the information that 5 of these had 10 to 15 years' supply of timber, 6 had 5 to 10 years' supply, 32 had 1 to 5 years' supply, and 17 had no timberland but operated on logs bought in the vicinity. (A survey by the Hardwood Manufacturers Institute showed that 83 hardwood mills with an estimated total annual production of 908,000,000 board feet were in operation in Louisiana on January 1, 1929; and that in the past five years 37 hardwood mills cut out and 21 new ones came into production in the State.)

Louisiana contains a very large percentage of the hardwood supply remaining in the United States. The hardwood lands are the wide river bottoms such as those of the Mississippi, Atchafalaya, Ouachita, and Red, the narrower bottoms of the smaller streams and rivers flowing through pine lands, and the uplands of the southeastern part of the State. The soils are exceedingly fertile, the growing season exceptionally long, and weather conditions favorable to tree growth. Not only is Louisiana now the leading producer of hardwoods in the United States, but its hardwood region has perhaps a larger capacity for the production of wood, under forestry management, than any other forest region in the United States.

Much of this region is potential farm land, but at present there is no general demand in Louisiana for cut-over hardwood lands for agricultural purposes. As a result of the adoption of more intensive farming methods the area under cultivation has in fact decreased markedly in the last 10 years. Large areas, also, remain uncultivated owing to lack of drainage, b would not need to be drained in order to produ timber.

In the pine region of Louisiana clear cutting follow by fire has in many cases resulted in such devastati that a new growth of timber trees can be obtained or by artificial reforestation; in the hardwood bottc lands no such devastated areas occur. Hardwo reproduction comes back even on areas that ha received the most severe treatment. Under prese conditions, however, the growth of a second crop is long, tedious process and the chance of a good sta of timber being produced in this way is very po Cut-over areas are often left with little or no growi stock or with inferior species largely monopolizing t site; or, worse, only the best trees of the most desirab species are cut, leaving a mature stand consisti largely of malformed specimens and undesirab species that hinders development of a valuable you stand.

Under present logging practice many small trees a cut just as they are beginning to put on clear growt If such trees were left for a later cut, with their allo ance of light and food material increased by the remov of competition they would rapidly increase in valu In 10 to 20 years they might easily be worth five ten times as much as when the earlier cutting was mad

A few farsighted Louisiana timberland owners ha realized that it is unprofitable to cut their sma trees and are now practicing selective logging. On the mature trees are taken, trees of small diamet being left to be cut when they are considerably larg and contain a greater proportion of the higher grad of lumber.

Oklahoma State Park Association

A State park association has been formed in Okl homa with Thomas H. Doyle, for a long time presidi judge of the Criminal Court of Appeals of Oklahom as chairman, and Charles C. Brill, sports editor of t Daily Oklahoman, as secretary. The board of directo includes the chairman of the fish and game commissio the State forester, the director of the geological surve the president of the Oklahoma Forestry Associatio and the president of the Oklahoma Automobi Association. A bill providing for the creation of State park commission was drawn up by the associa tion and introduced in the legislature, where it w passed by the house but was rejected by the senate the ground that it would lead to expenditures whic the State can not afford at present. It is planned have a similar bill introduced at the special session the legislature soon to be held.

* * *

The Maryland Legislature has made $50,000 avai able for the purchase of land for State forests in th next two years.

alifornia Counties Cooperate with the State in Fire Protection

A strong reinforcement of the agencies working to
event fires in California is hailed by State Forester
att as he announces that Shasta County has entered
o a cooperative agreement with the State division
forestry. The county board of supervisors has paid
500 as the county's contribution to fire-prevention
nds for the year beginning July 1, 1929. From this
ount will be paid the traveling expenses of a ranger,
d the salaries of temporary additional patrolmen if
se are needed. The State agrees to maintain a
nger in the county throughout the year and to pay
fire-prevention costs in excess of $2,500. In the
cision of Shasta County to take part in fire-preven-
n work Mr. Pratt sees a desire to assist in protecting
t only the important timber, grazing, and agricul-
al resources of the county but the brush-covered
d forested watersheds contained in the county upon
ich the entire Sacramento Valley must largely
pend for its summer water supply.

Madera County has renewed its agreement with the
ate for fire-prevention activities, contributing $1,500
ward the year's work. A ranger will be on duty in
e county seven months of the year and a lookout
ll be maintained on Red Top Mountain, the State
suming all expenses in excess of $1,500.

North Carolina Improves Its Fire Record

In reporting that 1,169 forest fires occurred on the
otected area in North Carolina during 1928, the State
vision of forestry charges 266 of these fires to brush
ning, 194 to incendiarism, and 175 to smokers.
other fires are classified according to cause as
llows: 131, hunters, fishermen, and campers; 74,
ilroads; 43, lumbering; 5, lightning; 127, miscel-
neous; and 154, unknown.

Of 89 prosecutions conducted during the year against
rsons charged with responsibility for fires, 62 resulted
thin the year in convictions. In these cases fines
nounting to $699 were imposed, and $590 was
sessed against convicted persons as court costs.
rsons responsible for fires paid suppression costs
taling $1,309.

Voluntary assistance in suppressing fires was given
ring the year by 2,865 individuals.

Forestry officials of the State express satisfaction in
e fact that in 1928, although the protected area was
rger by more than 1,000,000 acres than it had been
1927, the area burned over was only 80,611 as com-
red with 238,845 in the preceding year. The area
rned over by a single fire averaged 69 acres—the
st time in the record period that it was kept below
0 acres.

Forest Planting on Private Land in Texas

The era of forest planting on private land in Texas has dawned, the Texas Forest Service reports, with plantings made during the past winter on cut-over lands belonging to two lumber companies and on five farms. About 50,000 long-leaf pine seedlings went to the planting by the Angelina County Lumber Co. of 40 acres of land near Yancy, formerly occupied by an especially fine stand of long-leaf timber, and the Southern Pine Lumber Co.'s planting of about 10 acres near Pineland, in Sabine County. The stock was supplied from the State nurseries at $1.50 per 1,000. Members of the State forest service supervised the planting work until the crews became familiar with their method. The trees were planted in rows 8 feet apart, 6 feet apart within the rows. Both these plantations have been inclosed with hog-proof fence and surrounded with fire lines made by plowing two furrows 50 feet apart and burning the grass between.

The five plantings made on idle farm land called for 6,700 State-grown pine seedlings. H. W. Hawker, manager of Leone Plantation, at Teague, added to the 3,500 pines supplied to him from the State nursery some 5,000 short-leaf pines grown in a nursery of his own.

Three Four-H forestry club boys of Rusk County have planted a total of 1,700 long-leaf pines on their parents' farms. These boys are planning to raise Irish and sweet potatoes between the rows of trees, which are 6 feet apart.

The area of cut-over land in Texas that is without seed trees and requires reforestation by planting is estimated by the State forest service at more than 4,000,000 acres.

Pennsylvania Municipalities Plant Nearly Two Million Trees from State Nurseries

In Pennsylvania 1,991,775 of the trees distributed from the State forest nurseries in the 13-year period 1916–1928 have been planted on municipal land. Among 15 cities that have shared in the distribution Pittsburgh has used the largest number of the trees, 349,050. Reading follows with 223,800, Altoona with 161,000, and Philadelphia with 133,500. Boyertown has taken the lead among 48 boroughs by planting 130,000 of the trees and is followed by Fleetwood with 119,350, Broughton with 89,000, and East Stroudsburg with 65,000. Of 51 municipalities that began ordering State-raised trees before 1928 the majority have come back for a second helping, and many have "asked for more" two or three times. The city of Du Bois, beginning in 1917, has made nine successive annual plantings.

Recent Vermont Forestry Legislation

Under a recent amendment of the Vermont forest nursery law the State commissioner of forestry may sell nursery stock for as little as half the cost of production, when the stock is to be used in reforesting lands owned by municipal corporations, schools, churches, and colleges. For stock that is to be used in reforesting private lands he will continue to charge the full cost of production.

Another piece of legislation recently approved by Governor Weeks authorizes the Vermont commissioner of forestry to acquire, by gift or purchase, lands to be held and administered as State forest parks. A highway appropriation of $2,000 has been made for the building and rebuilding of a roadway on the Mount Philo State Forest.

The annual appropriation for the Vermont forest service for the next two years is the same as for the past two: $24,500 as a general appropriation and $8,000 for the purchase and reforestation of State forests, together with all receipts of the service.

Vermont Enlarges Mount Mansfield State Forest

The State of Vermont has recently purchased 1,238 acres of forest land on the west slope of Mount Mansfield, the highest mountain in the State. With this addition the Mount Mansfield State Forest has an area of 5,084 acres including practically all of the east and west slopes of the mountain. A narrow strip along the ridge is the property of the University Vermont. On the State forest are several hund thousand board feet of old-growth hardwoods, chie yellow birch and maple. Much of this timber mature. In cutting it the Vermont Forest Serv plans to protect the brooks and scenic attractions the region. Little or no timber is to be cut along trail leading from the "Halfway House" to the sumn

Vermont now has 18 State forests with a total a of about 34,100 acres.

* * *

Twenty members of the Elkins, W. Va., Y. M. C. found themselves willing to be enlisted in a forest fighting crew when the suggestion was made t spring by District Forester H. Y. Forsyth. Ca Talbott, president of the association, heads the cr The West Virginia State forestry organization supplied the crew with forest fire-fighting tools with a tool box. The box, labeled in black letters red, occupies a conspicuous position on the lawn of association, on the main street of Elkins. A spe signal with the city's fire alarm has been arranged calling the crew together.

* * *

This spring, as in 1928, New Hampshire towns h ing title to forest land that needed to be planted co obtain planting stock free of charge from the St forestry department. Last year 32 towns avai themselves of this privilege, receiving 250,000 trees

Education and Extension

Two Pennsylvania Schools Consolidated

Announcement has been made by Charles E. Dorworth, secretary of the Pennsylvania Department of Forests and Waters, of the consolidation of the State forest school at Mont Alto with the forestry department of the Pennsylvania State College. The union will be effective June 15 of this year, when students of the two schools will join for summer camp work.

The school at Mont Alto was established in 1903, and the forestry department of the State college in 1906. Both have been maintained by the State. Secretary Dorworth points out that a single State agency in forestry educational work will be operated much more economically and will offer greater opportunities to both instructors and students. In directing degree courses in forestry the State college is to have the advice of members of the State forestry organization and will have the opportunity to make such use of the Mont Alto plant as may seem most helpful.

The new plans include special forest ranger courses and an enlargement of special forest research studies.

New York Ranger School Offers Fu Year of Training

In 1930 the New York State Ranger School at Wa kena, N. Y., will extend its course to a full year. present the course begins in March and ends in Dece ber. Under the new arrangement, which is made po ble by the better housing of the school in the concr building dedicated in 1928, the course will begin first Wednesday in April and will end the second w in March of the following year, with a vacation of t weeks beginning in the latter part of June and one equal length at the Christmas holidays. De Franklin Moon points out that in addition to the be fits of more thorough training this plan will give fut graduates the advantage of leaving school at a sea more favorable for finding employment. The extens of the course will add about $100 to each studer expenses.

The ranger school has entered upon its 1929 sess with a record enrollment of 63.

rowth of Planted Trees in Michigan

[n a spring message to owners of farms and estates in chigan the State university quotes its results from years' experiments in timber growing to show what wth may be expected of trees planted in the State. the university's plantations northern white pine 27 ırs old has developed diameters as great as 7 inches. r this age group the average diameter, where trees spaced as far as 6 or 8 feet apart, is 4.5 inches. sely spaced northern white pine 22 years old shows average height of 27.2 feet and an average breastght diameter of 3.5 inches.

Scotch pine in 22 years has made an average height wth of 34.5 feet and has developed an average diamr of 4.5 inches. For this species, in a closely spaced ntation, the maximum diameter at 22 years is 9.7 hes. Red oak 16 years old is 18 feet high and 1.8 hes in diameter; yellow poplar 19 years old is 21.7 t high and 2.1 inches in diameter; and black locust years old is 28.6 feet high and 3.6 inches in diameter. With the exception of the poplar, all these plantations on rather poor gravelly soils of low agricultural ue.

California Extension Service Stages Traveling Fire-Control Show

A fire-protection show with many striking acts was t on the road in California this spring by the tension Service. Extension Engineer J. P. Fairık and Extension Forester Woodbridge Metcalf were performers, and the properties included fire-fighting ipment of many kinds. Traveling in a truck, the men gave talks and demonstrations in school rds, according to advance arrangement by the local n advisers. The extension forester's talk dealt fly with the State's forest-fire record, the causes l results of forest fires, and the importance of forest, ish, and grass cover in protecting watersheds and cking floods. His explanation of what constitutes l fire weather conditions was accompanied by the irling of an anemometer on top of a tripod set up the cab of the truck. He told how the State highy commission is making firebreaks along critical tions of road and urged a general clean-up of fire ards in the community before the dry season.

The extension engineer discussed and illustrated the st important causes of fires in farm buildings.

Several of the common types of fire extinguishers e shown, and the methods of charging and using m were demonstrated with miniature glass models. nd tools for fire fighting, from the lowly burlap sack the elephant hoe and pressure back-firing torch, e shown and their use explained. Various handnp tanks and back-pack pumps and a small portable oline pumper were demonstrated. By means of small rotary pumps driven by the engine of the ck, streams of water were thrown from nozzles of erent sizes ranging from that of a spray gun using about 6 gallons a minute, suitable for use on grass fires, to a 5/16-inch nozzle throwing 30 gallons a minute.

Several small fires were then started and the school children had a chance to use the extinguishers and pumps in putting them out.

Meetings of this kind were held by the two specialists in eight counties during March, with a total attendance of 2,258. It was planned to continue the series through April.

Estimates of Volume and Value Growth Stimulate Interest of Farmers

In demonstrating methods of timber estimating to Mississippi farmers, Extension Forester D. E. Lauderburn of that State is making his audiences prick up their ears by estimating also the rate at which the trees are increasing in volume and value. Mr. Lauderburn and the cooperating county agent determine by increment borings in a number of sample trees the approximate rate of growth of the timber, then tally a quarter-acre plot and compute the merchantable content of all trees 10 inches and larger in diameter at breastheight. They then estimate the current annual increment per acre in board feet, compute the stand that will be present 10 years hence, apply the current stumpage rate, and deduct the taxes. In a series of demonstrations in Winston County the gain in value per acre per year above taxes was estimated at $4.16 on a selectively cut tract, at $1.36 on a neglected one, and at about 75 cents on a tract of mature timber.

Wood-Lot Improvement Demonstration at Senator Copeland's Summer Home

Senator Royal S. Copeland entertained in April at a woods clinic in the Ramapo Mountains, in southeastern New York. The Senator owns a considerable area of forest land near Suffern, where he has a summer home. On this occasion he invited a group of his neighbors who own forest land to the Rotary luncheon and then took them to a selected woods area, where Paul D. Kelleter and J. D. Kennedy, of the New York State College of Forestry, explained the principles of wood-lot improvement and demonstrated timber marking.

The Ramapo Mountains are covered with a second-growth forest of hardwoods, in which a few conifers are scattered. This forest developed after old-time cuttings in which a very thorough job was done to furnish material to the brickyards along the Hudson. As yet no careful consideration has been given to the proper handling of the forest.

Later in the season, after the cutting operations have been completed, a second woods meeting will be called. At that time Senator Copeland plans to hold an evening session in the Suffern community hall at which wood-lot management will be further explained by words, slides, and movies.

Farm Timber Crop Sells for a Small Fortune

Timber as a farm crop has paid well in the experience of Ed Thompson, of Red River County, Tex. C. B. Webster, Texas extension forester, tells the story as follows:

Something more than 35 years ago Mr. Thompson bought 1,200 acres of land about 9 miles north of Clarksville which he had just finished logging for a timber company. He paid about $1.25 per acre. Here he built his home and began to farm. Eventually he put 200 acres under cultivation, leaving the rest in timber. He constructed fire lanes to protect his timber land and fought any fires that got a start. He took from the woods such material as he needed for use on the farm, always leaving the best trees to grow. Through the years when he was rearing and educating his children he made a good living from the farm. Today his timber looks like old growth, many of the trees having two or three clear 16-foot logs. Recently Mr. Thompson sold this timber, on the stump, for $50,000 cash.

A Wood-Lot Improvement Cutting to Favor Sugar Maples is Profitable

An improvement cutting recently made on a New York farm wood lot resulted in a return, above labor costs, of $198 per acre, writes Assistant Extension Forester C. A. Gillett. The cutting was a demonstration in which the Genesee County farm bureau cooperated, and the wood lot is the property of Ernest Wilker, Darien Center. The aim of the cutting was to favor the sugar maples and hasten the development of a sugar bush. On the quarter-acre plot chosen for the demonstration 57 trees that were undesirable because of poor form, disease, or overcrowding or because they were of weed species were marked in advance by Mr. Gillett. These trees constituted 38 per cent of the stand. Mr. Wilker's record of labor costs showed that it required 30 hours to cut and work up the marked trees. The product was 700 feet of elm logs valued at $25 per 1,000 feet, 10 face cords of fuel-wood worth $4 per cord, and 16 ash fence posts worth 25 cents each. The gross return from thinning the quarter-acre plot was $61.50. With labor valued at 40 cents an hour there remained a net profit of $49.50. The cutting left the plot in condition for rapid development into a good sugar bush.

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The Rotary Club of Jefferson, in Marion County, Tex., is giving special encouragement to the county Four-H forestry club. L. G. Braden, a Rotarian who owns a considerable area of timberland, offers to any boy joining the club this year the use of and income from as many acres of land as may be needed to carry out a forestry club project, on condition that the boy agrees to stick with the club and complete the work he starts.

Forestry Lessons for Farm Women's Clubs

At the request of farm women's clubs of Upsl County, W. Va., Extension Forester Thomas W. Sk has outlined a program of monthly forestry lessons be followed out by the clubs this summer. Commun club leaders representing eight clubs met with I Skuce to discuss the program. He provided each of th with a set of forestry bulletins including publicati of the Federal and State Governments, and show them where answers could be found in these bullet to a series of questions which he had drafted for th use, dealing with forest-land utilization, farm forest forest wild life, State and Federal forests, and wat shed protection.

Four-H Forestry Popular in New Hampshire

No less than 521 New Hampshire boys and girls t part in the work of Four-H forestry clubs in 1928, un the direction of Extension Forester K. E. Barraclo and county agents. There are now 62 such clubs in State. In 1928 the children planted 139,025 tr improved 220 acres of woodland, and made 124 w collections. Richard Sanborn, Epping, won a St championship by thinning, releasing, and prunin acres of young pine, planting 1,000 pines, and mak a wood collection. The other championship went Woodrow Wilson Foss, Barrington, who released m then 3 acres of northern white pine from overtopp gray birch. Among the many individual plant projects was one being carried on for the second y by two Campbell brothers, of Litchfield, for the fixat of drifting sands such as are common in the sec along the Merrimack River. These boys had an ex ple of such work before them in the form of a p plantation established on the sands by their father years ago, in which the trees are now more than 30 f high and average 4 inches in diameter.

Each of eight counties sent two forestry-club d gates to Camp Carlisle farmers' and home mak week at Durham for practical instruction in farm wo lot management. Gold, silver, and bronze med made available by the Society for the Protection New Hampshire Forests were awarded in each cou for individual forestry work.

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In March of this year Paul D. Kelleter, directo forest extension, New York State College of Fores gave his fourth annual series of forestry lectures high schools of New York City. With Frank Myers, one of his assistants, Mr. Kelleter lectured two weeks in junior and senior high schools of the c The two men gave 40 talks, at which the attenda averaged about 800.

Traveling Forestry Libraries in Mississippi

Five new traveling libraries have been put into rculation by the Mississippi Forest Service, which for year has been routing two library units to schools ıd has had one in use as a part of the county library ıat is distributed by motor truck from Clarksdale ıroughout Coahoma County. These library units ›nsist of about 50 books each. They include books ı a variety of subjects such as forest botany, conservaon, uses of forest products, elementary forestry, and ıtdoor recreation, and with these a few books of ·tion having forest conservation as an element in the ot or having scenes laid in the forest. Sets are made ailable for loan by the month where steady service a number of readers is assured.

West Virginia Forest Scouts

The West Virginia forestry organization is encourag g the appointment of Boy Scouts by scout masters as West Virginia forest scouts." Each scout so apointed pledges himself to put up 10 forest-fire-preention posters in public places in March and 10 more September, to distribute printed matter on forestry ıring Forest Week, and once a year to write an item 100 words or more on some forestry topic to be ansmitted by his scout master to local papers. A rest scout will be credited with exceptionally meritoous service if he discovers a forest fire and reports it to the nearest fire warden or county officer, extinguishes or assists in extinguishing a forest fire, or gives a forestry oration in his school.

Massachusetts Forestry Exhibit Wins Flower Show Prize

Writing of the display put on by the Massachusetts division of forestry at the Boston flower show, held March 18–23 in the Mechanics Building, District Forester D. C. A. Galarneau says:

> It was the first time we had enough space for a real show. We put on an exhibit of forest conservation and devastation and one of forest recreation, winter and summer. Although rather dead in color and placed in the midst of floral displays of ravishing brilliancy, the forestry display went over big with a different class of people from that which attends agricultural shows. For the $1,000 gold cup offered for the best educational display we couldn't hope to compete with a California woman who put on a 3-section display of cactus, desert, and redwoods at an expense of $25,000, receiving wild flowers from California each morning by airplane. However, we were awarded the North Shore Garden Club's cup, valued at $100.

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The Vermont Special, which left Montpelier on April 9 for a 10-day tour leading through the South and as far west as Des Moines, Iowa, carried as one of its industrial exhibits a display of the products of Vermont woodworking industries prepared by the State forest service, with Assistant State Forester P. H. Merrill in charge.

Forest Service Notes

A Survey of Forest Resources and Requirements

A good many estimates of the forest resources of the nited States have been made in the past. And from me to time conclusions more or less justifiable have en drawn from these estimates. Some of the estiates were drawn up with a good deal of care from mpilations of material gathered for other purposes. one of them, however, has been based on scientific udy and investigation designed specifically to provide full and accurate picture of what we have in timber pplies and what we need.

A fund of $40,000 provided in the Agricultural approiation act for the fiscal year beginning July 1, 1929, ıder authorization of the McSweeney-McNary Act, akes it possible for the Forest Service to begin such a mprehensive survey. When completed the survey is pected to serve as a foundation for a large part of all ture forest activities, making possible the drawing up plans for balancing the forest budget of the Nation that our forest supplies will always be sufficient to eet our forest needs.

Work on the survey will be begun in the Pacific Northwest and will later be extended to other regions as funds become available. The survey is designed to assemble data on the volume of merchantable timber now available, the present and prospective requirements for forest products, the annual drain on the forests from cutting, fire, disease, and insects, the present growth and the growth that could be obtained through the practice of forestry, the area and location of forest lands and the character of the growth they bear, and certain phases of the distribution of forest products.

Another economic study that the Forest Service is enabled to initiate in the coming fiscal year, through the appropriation of $25,000 under authorization of the McSweeney-McNary Act, will deal with the financial aspects of private forestry practice. An effort will be made to weigh the economic factors bearing on the opportunity for profit through private forestry practice in different regions and under various conditions. At the outset work will be concentrated in the southern pine region. A third study in the field of forest economics, to which the Forest Service expects to devote $10,000 of its 1930 appropriation under the Clarke-McNary law, is an investigation of forest insurance. Early work on this project will be concentrated in one region, probably the Pacific Northwest.

Research Reserves and Primitive Areas on the National Forests

By L. F. Kneipp, United States Forest Service

A newly formulated policy of the Forest Service looks toward the permanent preservation of conditions typical of virgin forest on several areas in each major forest region of this country.

With the exception of the national parks and the Indian reservations, the national forests contain the only considerable areas of land within the United States in which the original conditions have not been appreciably modified by human action. Each year is marked by some invasion of such areas, through the extension of roads, of industrial exploitation, or of modern forms of recreational use. These invasions, if allowed to continue, threaten ultimately to reduce our present "wilderness" areas to a condition indistinguishable from that of the common run of publicly owned forest lands in the United States.

It now seems to be indisputably established that such a result would constitute an irreparable loss to science, to education, and to society generally. Scientific study of the laws of nature would be less effective if the opportunity were lost to contrast the operation of such laws in areas modified by human action with their operation in areas not so modified. Plant and animal species of great potential value to science might be eradicated, through incapacity to survive under modified conditions. The stimulus to educational advancement arising from opportunity to study unmodified nature would be diminished. Lost, too, would be the social advantage of perpetuating some examples of the conditions under which the earlier development of the Nation took place and which influenced national ideals, traditions, and modes of life. Added to all these would be the fading from existence of the opportunity for a unique type of outdoor recreation that contributes directly and in marked degree to the maintenance of high mental and physical standards.

During the past decade the Secretary of Agriculture has classified several national forest areas as chiefly valuable for outdoor recreational use and has stipulated that on these areas all other forms of use shall be coordinated with recreation. More recently several of the district organizations of the Forest Service have developed or begun to develop programs for the preservation of "wilderness" areas. The management plans of different national forests provide in a number of ways for partial or complete protection of small areas.

Primarily these different measures have been designed to safeguard recreational opportunities. But in late years the value of unmodified areas to science an research, particularly forest research, has become mo and more evident and has received increasing emphas from individual research workers. This form of lan service must be recognized and provided for. Man tracts of national forest land will contribute more the advancement of forestry if dedicated to such u than if devoted to commercial timber production other forms of industrial utilization. Some areas virgin type already have been designated as exper mental demonstration forests in connection wit research work.

In view of all these considerations the Forest Servi is undertaking progressively to provide for the perm nent dedication and preservation of two classes areas—research reserves, to meet needs of science an education; and primitive areas, set aside for purpos primarily inspirational, educational, and recreational

So far as is practicable, the system of research r serves will be designed eventually to insure the prese vation of virgin areas typifying all important fore conditions in the United States, and permitting co tinuity of study to climax types. This will probab mean a half dozen such areas for each forest regio Each experiment or demonstration forest should en brace one such area. But if a forest type is adequate represented in some other permanent form of reserv tion such as a national park, it may be found unnece sary to preserve a duplicate example on a nation forest.

Within research reserves, scientific and education use will be dominant and exclusive. Only very car fully restricted and regulated public occupancy will allowed. Industrial utilization of resources will permitted only in the rare case in which it may employed under careful restriction to work out a scie tific problem. Caution will be exercised in determin the boundaries of research reserves to avoid the u necessary inclusion of lands not essential to the scie tific or educational use of the area. The area requir for the maintenance of virgin conditions over any co siderable period of time will vary with the type forest involved, or possibly with climatic and top graphic conditions; under average conditions, it expected, the minimum will be about 1,000 acres.

The use of research reserves for research purposes other Federal or State agencies will be freely and ful allowed.

On tracts set aside as primitive areas, the intenti will be to maintain primitive conditions of trav habitation, subsistence, and environment. The stan ard of primitiveness will necessarily be a varying on approximating sometimes the environment of t Indian, in other cases that of the early fur trader trapper, the pioneer miner or the pioneer stockman settler, or the logger. No hard and fast rules will established as to whether or under what circumstanc timber cutting, grazing, water storage, trails, road habitations or other structures, partially or fully i proved camp grounds, commercial camps, resorts, etc., re to be prohibited or allowed on primitive areas. These questions must be determined in the light of the onditions peculiar to a given area and of the types of uman needs it is to serve.

The establishment of a primitive area will not result n any reduction in the standards of fire prevention varranted by the existing circumstances. The roads, rails, telephone lines, and lookout towers required to give the area adequate protection will be installed as in other similar national-forest areas, but with due regard to the preservation of primitive values. Road or trail construction other than that required for fire prevention, administration, or forest utilization will be confined to the minimum. Occupancy under permit also will be held to the minimum.

Results of Practical Tests of Treated Ties

Treated railroad ties of cottonwood, western hemlock, western larch, Douglas fir (mountain type), and white fir are giving satisfactory service in test tracks laid by the Northern Pacific Railway and the Oregon Short Line Railroad, the Forest Products Laboratory reports. Creosoted cottonwood ties at Lolo, Mont., and Marshall Junction, Wash., after 18 years' service appear to have a prospective average life of more than 20 years. Western hemlock ties at Missoula, Mont., have been in service nearly 19 years with less than 1 per cent removed. Creosoted western larch ties in a test track at Thompson Falls, Mont., have been in service about 13 years with less than 3 per cent removals due to mechanical wear and no removals due to decay. Zinc-treated ties of this species in a Plains, Mont., test track after 20 years' service appear to have prospects f an average life of about 20 years. Mountain-grown Douglas fir ties treated with creosote that have served 12 to 13 years in the Thompson Falls track give evidence of ability to complete an average life of 15 years or more; and zinc-treated ties of this wood in the Plains test track have been in service about 20 years, with removals of 76.7 per cent. Creosoted white-fir ties in the Thompson Falls track have served 13 years with but 2½ per cent removals due principally to mechanical wear.

In the Oregon Short Line test tracks in southern Idaho, after from two to five years' service ties of western yellow pine, lodgepole pine, mountain Douglas fir, coast Douglas fir, Engelmann spruce, and white fir that were treated with straight zinc chloride are checking and splitting more than ties of the same species treated with straight creosote, mixtures of creosote and other oils, or zinc chloride followed by petroleum (a 2-movement treatment). These results constitute further evidence that a straight zinc chloride treatment is not entirely suitable for ties to be used in very dry climates such as that of southern Idaho.

Growth of Northern Hardwood Stands

A study of the rates of growth of northern hardwoods has been carried out in northern Wisconsin by the Lake States Forest Experiment Station with the cooperation of the agricultural experiment station of the University of Wisconsin and several Wisconsin lumber companies. On the basis of data obtained by examining 24 sample plots, located principally in Florence and Forest Counties and having an aggregate area close to 112 acres, calculations were made as to the rate of growth in virgin forests, on clear-cut land, and in partially cut stands. The principal species involved were sugar maple, yellow birch, eastern hemlock, and basswood. Mixed with these were beech, American elm, northern white cedar, balsam fir, occasional northern white pines, and other species characteristic of northern Wisconsin.

Conclusions from this study are reported by Raphael Zon and H. F. Scholz, of the Lake States Forest Experiment Station, as follows (all calculations are for unburned stands):

An old virgin hardwood-hemlock forest produces about 213 board feet per acre per year. This annual growth, however, is counterbalanced by loss through windfall, decay, and death of some of the overmature trees with the result that there is no net growth. An old hardwood-hemlock forest can maintain its merchantable volume indefinitely, provided it is not visited by exceptionally severe storms or epidemic attacks of insects or disease. Although there is no physical loss to the forest there is an economic loss, because the annual growth of 213 board feet merely replaces the loss through decay and windfall and serves no useful economic purpose.

On land cut clean of its original forest the growth is at the rate of from 55 to 65 board feet per acre per year. This growth, in the case of complete stripping of all trees down to 6 inches in diameter, is not available until the stand reaches an age of from 80 to 100 years.

In stands cut over partially or selectively, the growth varies from 110 to 195 board feet per acre per year. During the 20 to 30 years next following cutting, growth in volume is at the rate of 120 board feet per acre per year in stands from which 89 to 96 per cent of the merchantable volume has been removed; at the rate of 148 board feet per acre per year in stands from which 63 to 85 per cent of the merchantable volume has been removed; and at the rate of 174 board feet per acre per year in stands from which 26 to 58 per cent of the merchantable volume has been removed.

Partial cutting does not increase the loss through windfall or mortality. The normal loss through these causes is about 16 board feet per acre per year, or about 10 to 11 per cent of the average annual growth of 145 board feet.

Clean cutting changes the composition of the future stand. On areas cut clean, the new stand contains more yellow birch, basswood, and American elm, and less sugar maple and eastern hemlock than was in the original forest.

Partial cutting encourages sugar maple at the expense of yellow birch, basswood, and American elm. Continued partial cutting may, therefore, convert the forest into an almost pure sugar maple stand. This is not an economic disadvantage, as sugar maple is one of the more important trees in northern Wisconsin.

Slash Disposal on Steep Slopes in the Douglas Fir Type

By L. D. Blodgett, United States Forest Service

The logging of steep slopes in the Douglas fir type often leaves the forester a choice between two evils—burning the slash with the risk that the fire will destroy the seed trees and the protection forest above the cutting line, or leaving the area unburned and thus making it necessary to provide intensive fire protection until the new cover is established. Some burning is always needed to break the area up for fire-protection purposes and to dispose of exceptionally heavy slash that if left on the ground would shade it to such a degree as to preclude Douglas fir reproduction. It is usually advisable, also, to burn such areas along main-line railroads as would otherwise constitute a continuous hazard to the entire operation. Practically all foresters now agree that burning, in itself, is not essential to reproduction or to the control of species.

After it has been decided to burn a certain area the question of when and how to burn requires careful study and the application of sound judgment. The peculiar aspects of the area must be considered, its relation to adjoining areas, and the order of cutting. In fact, these things should be considered in advance of logging and plans affecting the entire operation should be laid two or three years in advance. Another very important factor to be considered in timing a slash fire is the presence or absence of a seed crop.

The two periods during which slash may be burned are the fall and the early spring.

The advantages of fall burning as compared with early spring burning are that it leaves the area cleaner, hence less liable to subsequent burning and in better condition for Douglas fir germination; that it involves less risk from hang-over fires; and that, if the burning occurs in a good seed year just before seed dissemination, it allows the reproduction to get an even start with the weeds and shrubs which always begin to grow the summer after the burning. Disadvantages of fall burning are that it burns deep, destroying whatever seed may be stored in the duff; burning must be done prior to the normally very heavy fall rains, at a time when the surface under the green timber is just as dry as or drier than the slash, so that control of the fire is very difficult; and that slash burned at this time of year produces a very intense heat, which on a steep slope is most destructive to seed trees.

During the fall of 1926 the slash was burned on two areas on the Webb Logging & Timber Co. operation on the Olympic National Forest, Wash.

The first, an area of about 60 acres lying on a steep slope with a south exposure, was fired on September 9. The slash on this area was comparatively light. There had been considerable rainfall during the month; in the open the slash was only fairly dry and under the timber it was decidedly damp. The weather had been very murky and oppressive all day, and t Weather Bureau forecast was for rain in considerab quantities. The fire was started about 7 p. m. alo the top of the ridge and was allowed to work its w down the hill. By 8 p. m. a dense fog had rolled in a by 10 p. m. this had turned to rain, which continu for several days. A more ideal condition for burni could scarcely be hoped for; still the excessive roll burning material on this steep hillside spread the f so rapidly down the hill that the whole area was af before the fire had completely burned out at the to The heat was so great that a seed tree would burst in flame and its crown burn out before the fire on t ground had reached its base. Several trees were u rooted and thrown up the hill by the terrific draf There was little or no wind except that created by t fire, and the relative humidity was above 90 per cen In spite of fog, rain, and absence of wind, out of 50 60 trees only 8 survived the fire. These stood near th bottom of the slope, where the ground was less stee and no heat was drawn through their crowns.

As a trial of a late fall burn, an area of like size wa burned on November 3. There had been a great de of rain during the fall, and the material under th green timber was positively wet. A few hot days ha somewhat dried the slash. We started the fires, a usual, along the green timber at the upper edge of th area, about 1.30 p. m. The weather was clear, wit no wind. Because the material was decidedly damp considerable difficulty was experienced in getting it t burn. By firing it in strips, however, we finally go it to burning briskly. When the fire had burne down from the timber 150 feet or more, as it was growing late in the afternoon the decision was made t start fire along the lower edge of the area and let i run to meet the upper fire. This created such a volum of heat that the fire jumped the 150-foot strip alrea burned, crowned in the timber, and in one flare ra one-fourth of a mile to the top of the ridge. The surface of the ground under the timber did not burn ove until later.

In both these cases burning was done under what appeared to be the most favorable conditions, yet considerable damage was done to seed trees and protectio forest and in the second instance it looked for a fe minutes as if a serious conflagration would result However, both these areas were burned very clean an are in ideal condition for reseeding.

The advantages of spring burning as compared wit fall burning are that in spring, since the slash in th open usually dries out much more quickly than th standing timber does, the chances of damaging th surrounding timber are much less; that the fires d not burn deep enough to destroy entirely whateve seed may be in the duff; and that fires burn less rapidl and create less heat, and therefore are less destructiv to seed trees. The disadvantages of spring burning are that it destroys seed from the fall seed drop, o top and near the top of the ground; if it is done early ough to permit reasonable assurance of sufficient t weather to put the fires out, not enough of the aterial is burned to reduce the fire hazard to any eat degree; later, when a reasonably clean burn may expected, there is a very high risk of adverse weather nditions developing before fires can be completely tinguished; and the risk of hang-over fires breaking t is very high. Slash resulting from fall and winter gging can seldom be burned until late in the spring, d a poor burn usually results.

In the spring of 1926, a large body of slash was fired March 31. The area was on a moderate slope ving an eastern exposure, with the railroad grade ong the upper edge. The humidity rose rapidly in e evening, and although a crew of men worked all ght they succeeded only in getting a few small spots ire. The fire was set along the grade and allowed work down the hill. The following day an east ind sprang up and by 11 a. m. was blowing a gale, ith the relative humidity at 19 per cent. In spite of e efforts of 150 men using three locomotives the fire mped the track and burned over a quantity of felled d bucked timber. As soon as the wind went down the evening the humidity came up and the fire ent out almost completely. The few remaining spots ere put out during the next two or three days with o further difficulty. Furiously as this fire seemed to urn, subsequent examinations showed that it had urned only in spots and had done very little toward educing the fire risk.

According to my experience, fire lines on steep slopes t best can not be depended upon. If properly located hey can be used to stop a slow-creeping fire or a fire hat is working back against the wind. They are ractically useless around the upper side of a slash fire o prevent the fire from entering green timber. A fire e is equally useless on the lower side of a fire on a teep area, on account of the roll.

With an area of between 400 and 500 acres of slash o be burned on this operation in the spring of 1928, somewhat new departure from the conventional nethods was tried out. This area for the most part s very steep and has a general south and southeast xposure. Being cut up by sharp spur ridges and anyons, it has many northeast and southwest slopes. The original plan was to burn the area in the fall of 1927, but logging was not completed in time to allow this. The burning could not be postponed until the next fall, for by that time the adjoining timber would be down, making a continuous body of slash into the next unit.

Conditions were carefully studied, and burning was started on March 1. It was found that the slash would not burn except on the steepest slopes having a southwest exposure. Every day that the weather was favorable a crew of four men was sent out with oil and torches to spread the fire on the driest portions. At the end of a week practically all the south and southwest slopes were burned over, all north and northeast slopes being still covered with snow. As fast as the material dried out it was burned, and by the time the weather became dangerous the entire area had been burned over.

The slash on this area was comparatively light. On steep areas this is generally the case, with the result that where the slash burns at all it burns very clean. On areas where the débris is exceptionally heavy or matted this method probably would not work so well. The burning caused very little trouble except to require some attention at the bridges, and caused no damage at all to the seed trees. It is a rather long-drawn-out process, but it is believed that this will prove far less objectionable than waiting until the whole area is ready and then having an uncontrollable fire. No fire lines whatever will be used in connection with this sort of fire. In this instance a locomotive with a tank car was at hand to protect the bridges. Another advantage of this method is that most of the hang-over spots burn themselves out without needing to be worked. Of course this is an experiment that has not yet run to a conclusion, and more may be said about it later.

My belief regarding slash disposal on steep slopes is that the best practice is to leave most of the slope unburned, planning the operation so as to allow this, and burning on only such portions as must be burned to give maximum protection from accidental fires.

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In the 9-month period ending with March, 1929, receipts from the use of the national forests totaled $3,901,929. This is $600,328 more than the national forest receipts for the corresponding period of the preceding fiscal year. An increase of $615,501 is represented by the $2,761,998 brought in by timber sale, one of $5,986 by the $101,283 brought in by water-power permits, and one of $4,905 by the $16,130 brought in by the sale of turpentine. Receipts from grazing fees, amounting to $707,317, showed a decrease of $27,153.

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United States immigration officers patrolling the Cleveland National Forest, Calif., are to be armed for fire fighting this season, each officer carrying in his car a shovel and ax furnished by the Forest Service.

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Correction: The item on page 13 of the March, 1929, FOREST WORKER about measurements made by foresters of the Lake States Forest Experiment Station on hard maple cordwood cut near Ruse, Mich., should have stated that the average quantity of material in a standard cord was found to be as follows: In a cord made up of round sticks of various diameters, 65 cubic feet of wood and 15 cubic feet of bark; in a cord made up of round sticks having a middle diameter of 5 inches, 39 cubic feet of wood and 11 cubic feet of bark; and in a cord made up of round sticks having a middle diameter of 20 inches, 73 cubic feet of wood and 15 cubic feet of bark.

An example of the gain made in a period of 22 years by young red spruce released through the girdling of old hardwoods under which they formerly struggled for existence is visible at Corbin Park, N. H., where an experiment was instituted that long since by the United States Forest Service. A recent analysis shows that volume growth of the spruce has been more than five times as rapid on the heavily girdled plot, and th times as rapid on the moderately girdled plot, as on plot where the old hardwoods were left intact. T heavily girdled plot, on which only 2 square feet basal area of hardwoods was left, has produced appr imately 10 cords of spruce and balsam pulpwood acre in 22 years.

General Forest News

Forestry at Crossett

By L. R. Wilcoxon, Crossett Lumber Company, Crossett, Ark.

Several years ago we began to notice that among the logs which we were manufacturing into lumber were some that had reached a merchantable size since the beginning of our sawmill operation in 1902. This suggested that it might be possible to prolong the life of our operation by growing timber on cut-over lands. A hasty survey of our holdings brought it home to us very forcibly that E. W. Gates, general manager of the Crossett Co., had displayed rare judgment in blocking up the original timberlands. Mr. Gates's appreciation of growth possibilities had led to the purchase of areas of immature pine for future operation.

The Crossett holdings are located in one of the most favorable timber-growing sections of the South. Ultimately we became convinced that timber crops could be grown profitably on our lands if the logging of virgin areas were conducted in such a way as to leave the land in a satisfactory condition for natural reforestation and if an adequate scheme of forest fire control were introduced.

This was not a hasty decision; the idea developed gradually over a period of years, during which time various factors contributed to its growth. Charles H. Watzek, now one of the directors of the company, who was graduated from the Yale Forest School in 1911, was instrumental in having the southern spring field work of the school held on the Crossett property in 1912. The instructors who conducted this work prepared a brief report on the possibilities of forest management on the property and also one on timber utilization in the woods. These reports helped to increase the gradually broadening interest in the subject of industrial forestry, which at that time was a child disowned by southern pine operators. The school again held field work on the company's holdings in 1919, and each year since 1924 Yale students have come to spend two weeks studying the logging and forestry work of the company.

In the summer of 1922 Prof. H. H. Chapman, of the Yale Forest School, made a preliminary examination of the holdings of the company, following which he definitely recommended that we inaugurate a forestry policy and employ a technical forester. This was d during the latter part of 1922 when W. K. Williams, came to the company, from the Yale Forest School, its first forester. Mr. Williams left in 1926 to beco extension forester of Arkansas. In the spring of 19 A. E. Wackerman, a Yale Forest School graduate fr the Lake States Forest Experiment Station, beca resident forester. Under his direction the work h greatly expanded and rapid progress has been ma along both silvicultural and protection lines.

One of the most important problems in timber cro ping in the southern pine region of southeast Arkans is the prevention and control of forest fires. A stu of our fire problem showed that a good part of t fire damage was traceable to our own logging ope tions. This led us to put our own house in order substituting oil for coal and pine knots as fuel f woods locomotives and loaders. The woods crew also, have become most alert to prevent the sprea of fire, and we no longer hesitate to use any number loggers necessary to fight forest fires in the vicinity the logging operation. Thus the company has eli nated the hazard formerly arising from its own oper tion.

The company has also taken action to reduce fire damage to its own and adjacent property from oth causes. Its Arkansas property has been divided in four forest protection districts, and its lands in Loui iana are in a district that is handled in cooperati with the State forester of Louisiana. Each of t Arkansas districts comprises from 150,000 to 200,0 acres. In some instances half the area in a district noncompany land that is protected at company expen and without any local, State, or Federal aid whats ever. Each district in Arkansas is in the charge of permanent resident chief having under him sever part-time fire wardens who form the first line of defen in fire fighting and when necessary serve as forem of fire-fighting crews. Each district chief is equipp with a Ford truck, spray pumps, rakes, axes, and fi swatters. Each warden, also, has a supply of rakes an swatters. (The swatter, a most effective piece of equi ment for beating out fires, is made by fastening a 3 inch length of old 12-inch leather belting to a 6-foo handle.)

The duties of the district chief are many, including operating with neighbors in every possible way, ening and maintaining woods roads and fire lines, pervising fire prevention and control measures, and ndling any incidental company business that may se in the district. We have opened up several hun-ed miles of old roads, which makes it easy to get into y part of the territory with a light car. We have five kout towers 93 feet high, manned by lookouts who e available at any time of the year. The towers have ephone connections with the district chiefs, the rdens, and the office, so that fires can be reported d crews organized without loss of time. The towers e so located that every portion of our holdings is thin the range of at least two lookouts. This makes possible to get cross-bearings on a fire and locate it actly by means of alidades similar to those used by e United States Forest Service.

A system of silvicultural practice was worked out for r use under the direction of professional foresters. me of our local men have been trained to select the oper kind of trees, at correct intervals, for seed trees, d it is now our practice to leave seed trees on all gged areas. When possible, we choose loblolly pines r seed trees; we prefer the loblolly for second growth, ther than the shortleaf pine with which it is inter-ingled in the present stands on our land, because it is ore thrifty and faster growing, has a better root stem, and is better able to withstand high winds.

Our method of team logging seldom causes damage the trees we leave for seeding. Our cutters, also, e careful to avoid damage to trees below logging ze.

Investigations a few years ago showed that we could t handle profitably trees that were less than 15 inches iameter at the stump. An analysis of the cost of uction and sale value of lumber from small trees dicated that we were losing 56 cents per 1,000 board et in cutting 14-inch trees and 72 cents per 1,000 ard feet in cutting 12 and 13 inch trees. The pros-ective profit on these small trees after 10 years' rther growth was found to be 86 cents per 1,000 ard feet for the 14-inch trees and 64 cents per 1,000 et for the 13-inch trees. A 20-year wait, according the analysis, promised profits of $1.35, $2.02, and 2.27 per 1,000 feet, respectively, for trees that were 2, 13, and 14 inches in diameter at the stump.

After experimenting for several years with leaving ed trees, protecting young growth from logging dam-ge, keeping fire out of the woods, and cutting only trees 5 inches or more in diameter, our company finds that ese practices do not necessarily increase costs but, plans are well thought out, actually reduce costs.

The responsibility for maintaining the lumber output f the South rests on the shoulders of the loggers. If ll loggers saw clearly the benefits that are inherent the perpetuation of the timber supply, we should ot now be confronted with the spectacle of so many of our mills cutting out and leaving communities desolate. Of course this doesn't mean that we can maintain production at the present rate; but, at least, we can have one permanent mill where we otherwise should have three cut-out mills.

Paper Company Starts Timber Growing as It Builds Its Mill

While building a sulphate pulp mill in Mobile, Ala., at an expense that is expected to amount to about $6,000,000, the Southern International Paper Co. is starting out to raise pulp wood for the mill's future supply. It is expected that the mill will consume about 300 cords of pine pulp wood a day and produce about the same number of tons of pulp, mainly for the manufacture of kraft papers. As a beginning in providing pulp-wood supplies to feed the mill the company has purchased 37,000 acres of cut-over lands in Baldwin County, near Gateswood, formerly owned by the Southern States Lumber Co.

Myron L. Kahler is employed by the company as forester, and Richard A. Bingham has been installed as resident woods superintendent with a staff of three patrolmen. Firebreaks have been constructed along all roads and on all section lines by plowing two parallel lines (of two furrows each) 10, 15, or even 25 feet apart, and burning the débris between them. Eleven tall trees have been spiked for use as lookout points. In its endeavors to keep down fire damage the company has the cooperation of the Alabama Commission of Forestry.

This property is a choice long-leaf area on which regeneration is virtually complete, State Forest Inspector Harry F. Smith writes. While pulpwood production is the main purpose with which it is being managed, the company expects to market naval stores, ties, piling, poles, and lumber.

Through the operation of the pulp mill in Mobile, Mr. Smith observes, farmers in areas contiguous to the Alabama and Tombigbee Rivers will be provided with an outlet for thinnings and small timber that they would otherwise consider waste.

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An offer of the Bureau of Foreign and Domestic Commerce to join with the naval-stores industry in cooperative research was accepted in a resolution adopted at the "get together" conference of naval-stores interests at Pensacola, Fla., February 20–22. The bureau's suggestion is that the work should begin with a study to discover the various present uses of turpentine; the development of estimates of the volume consumed in each of these uses; and a complete study of turpentine merchandising methods as compared with methods employed in merchandising other commodities.

The Fight Against European Larch Canker

Efforts to eliminate the European larch canker as a menace to forests of Douglas fir, western yellow pine, and other valuable species in this country are being made by the office of forest pathology, Bureau of Plant Industry, on the basis of a Federal appropriation of $35,000. Of this appropriation $10,000 has already been made available and the remainder will become available on July 1 of this year. The Federal campaign includes, first, scouting to discover any new infections, beginning in New England and working westward, paying particular attention to places where European larch and Douglas fir have been planted as ornamentals; and second, research to confirm the identification of the disease. The latter phase of the work is complicated by the fact that the parasitic European fungus very closely resembles a native fungus, not an active parasite, that is generally distributed on the native eastern larch from Newfoundland southward and westward to unknown distances.

Practically all the trees that have been found to be infected with the parasitic fungus have been destroyed. These included imported European larches, Japanese larches, and Douglas firs and western yellow pines, growing in Massachusetts and Rhode Island.

Needleminer Attacks Lodgepole Pine in Central Oregon

By J. E. Patterson, United States Bureau of Entomology

Near the town of Lapine, in central Oregon, a lepidopterous needleminer not known to have occurred previously in that State made its appearance in 1925, defoliating lodgepole pine over an area of about 40 acres. By July, 1928, the infestation had spread over 130 square miles of lodgepole forest. The Dalles-California highway passes through the main portion of the infested area, and defoliated trees may be seen on both sides of this road for a distance of 13 miles. If the infestation continues to develop at the same rapid rate, it will soon spread throughout the extensive stands of lodgepole pine that are contiguous to the present infested center.

This undescribed Recurvaria closely resembles Recurvaria milleri Busck in size and markings, in habits, and in character of damage. It differs in life cycle, having one complete generation each year instead of the biennial life span of R. milleri. Adult moths were collected in July, 1927, and in August, 1928. The season of greatest activity is from June 20 to September 15. So far the insect is not known to attack any species other than lodgepole pine.

On trees attacked by this insect the body of the needles is hollowed out by the feeding larvæ, with the result that the foliage dies. The defoliation results in impairment of tree vitality and reduction of grov rate.

Trees that have been greatly suppressed by repea defoliations are very susceptible to bark beetle atta There is an incipient infestation of the mountain p beetle in the lodgepole pine stands near Lapine, serious developments may be expected from this ca if the needleminer infestation persists through the n few years.

Relief for Ivy and Sumac Poisonin

To those who suffer from ivy and sumac poison the Bureau of Plant Industry recommends lavish of soap and water as soon as possible after exposu The poison requires some time to penetrate the sk and until it has done this it may be removed by repea washing and rinsing. Ordinary kitchen or laund soap having an excess of alkali is best for the purpo and should be used with hot water. The soap sho be applied freely so as to produce an abundant, hea lather on the skin surfaces that have been exposed, th rinsed off completely. This operation should repeated with fresh water not less than three or fo times. The hands, and especially the nails and tender skin between the fingers, should receive p ticular attention. Careless washing may serve spread the poison. Hard scrubbing with a stiff bru is not advised, as it may rub the poison in and stir infection; if wash cloths are used they should be u in series, a fresh one for each washing. Even if wa ing is not begun before the inflammation develops should be tried in order to remove from the skin traces of the poison that can still be reached.

It is possible also to remove the poison by cleans the exposed parts repeatedly with alcohol diluted w an equal quantity of water. Alcohol, however, m dissolves the poison, and unless applied in such a v as to insure its complete removal may spread it o wider areas. The alcohol may be dabbed on with piece of absorbent cotton and should be promp removed with a dry piece, fresh cotton being used each of several repetitions of this process.

Some of the salts of iron which have a neutraliz effect on the poison are reported to have been used w good results as preventives. A solution of 5 parts ferric chloride in 95 parts of a half-and-half mixt of water and glycerin, or a solution of 1 part of ferr sulphate in 5 parts of water, is recommended as a lo application for this purpose. Either of these soluti may be applied freely to the skin and allowed to on it in anticipation of exposure to the poison. Su solutions are also very helpful if used soon after cont with the plants.

As a remedy for poisoning a 5 per cent solution potassium permanganate applied locally is reported be very effective. The brown stain caused by th solution will gradually wash off, or may be remo e rapidly with lemon juice or with a 1 per cent tion of sodium bisulphite.

or relieving the inflammation, simple remedies such ocal applications of solutions of cooking soda or of om salt, one or two heaping teaspoonfuls to a cup vater, are said to be ordinarily as helpful as any. id extract of grindelia, diluted with 4 to 8 parts of er, is often used. Solutions of this kind may be lied with light bandages or clean cloths, which uld be kept moist and should also be changed and arded frequently in order to avoid infection. Dur- the night, or when moist applications can not be d, the poisoned surfaces should be carefully cleaned dried and left exposed to the air rather than tightly daged. Immersing the poisoned parts for several utes in water as hot as can be borne, or where this npracticable applying hot towels, is recommended elieve the itching. It increases the discomfort at moment of application but is followed by a period reat relief. In the early stage remedies with a fatty ily base, such as ointments, should not be used, as ase or oil tends to dissolve and spread the poison. he later stage, after the toxic material has exhausted lf, zinc-oxide ointment and similar mild antiseptic astringent applications hasten healing.

he formula for a simple remedy that may be dabbed the poisoned parts or applied to them by saturating or two thicknesses of a light bandage, and that is ful at both the early and the late stage, is as follows:

Zinc oxide	15 grams
Phenol	2 grams

Lime water to make 250 cubic centimeters.

efore this remedy is applied the skin should be roughly cleansed.

rmination Tests on Birch Seed at Boyce Thompson Institute

series of germination experiments carried out with ch seed at the Boyce Thompson Institute for Plant search are described by Hilda C. Joseph in the tanical Gazette of January. The seed used were the four species sweet birch (*Betula lenta*), gray ch (*B. populifolia*), paper birch (*B. papyrifera*), yellow birch (*B. lutea*). Seed dry-stored in the oratory for one month were found to germinate ll at a temperature of 32° C. and at an alternation 15°–32° C., but did not germinate well at constant nperatures of 25° C. or less. After one and one- f years' dry storage at laboratory temperature the d required remarkably high temperatures for ger- nation, the minimum germination temperature ng 30° C. for sweet birch and about 20° C. for the ee other species.

The degree of heat required for germination was ich reduced when the seed were afterripened by ing stored for a time in a moist condition at low nperatures—that is, in conditions approximating those under which in nature most of the seed would have spent the winter buried under leaves and snow on the forest floor. Four weeks of afterripening at 0° or 5° C. put the seed into condition for excellent germination at 15° C.; 6 to 8 weeks of such storage prepared the seed for good early spring germination in outdoor seed beds; and 5 or 6 months' storage at 0° C. was followed by profuse germination even at that temperature.

In these experiments the seed were afterripened in lots of 200 on filter papers in Petri dishes, in which they were also germinated. Moist sand, granulated peat, and blotting or filter paper were found to be equally effective as a medium for stratifying seed for the afterripening process; thus the seed appear to be indifferent to a considerable range of acidity in the medium. Germination of dry-stored seed was found not to be affected by variations in intensity of light and oxygen pressure. Seed sterilized with 0.2 per cent uspulun for one-half hour showed a slightly lower percentage of germination.

Seed of paper birch were found to be less dormant than those of the other species studied, and to fall in vitality more rapidly in unfavorable conditions.

Seed of sweet birch and gray birch kept perfectly during one year of air-dry storage at room temperature, while those of paper birch and yellow birch fell in viability. The optimum moisture content for paper birch seed stored at room temperature in sealed containers was found to be 0.6 per cent. Gray birch seed kept best with a moisture content of 5.2 per cent. Sweet birch seed kept well in all except very humid conditions during one year's storage. Stored at icebox temperature, seed with higher moisture content kept as well as seed low in moisture for one and one-half years.

Experimenting with seed of sweet birch, Miss Joseph found that birch seed are harvested to best advantage after the catkins have dried on the tree, but before they have opened far enough for a considerable proportion of the seed to be shed. The seed should be shaken from the catkins, dried on well-ventilated racks, and stored. About six weeks before planting the seed should be stratified in a suitable moist medium at temperatures of from 32° to 41° F. After such treatment they will germinate in the seed beds in early spring. It takes approximately one month to six weeks for a full stand of young seedlings to appear above the surface of the soil. Early spring planting is recommended.

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The Field Museum of Natural History has sent L. Williams, a wood technologist of its staff, to South America to make a survey and collection of tropical woods. The expedition is expected to take Mr. Williams 2,300 miles along the Amazon River and across the Andes Mountains, alone except for natives.

St. Paul Municipal Forest Experiments Result in Planting Suggestions

By J. H. Allison, University of Minnesota

For 14 years the water department of St. Paul, Minn., has been developing a municipal forest on land surrounding Lake Vadnais, which lies about 7 miles due north of the city. With the cooperation of the University of Minnesota, plantings have been made every year since 1914. The plantations now cover 225 acres. Part of the tract has a scrubby growth of native oaks.

This tract lies near the center of the hardwood transition belt between the northeastern section of Minnesota, formerly forested with conifers, and the prairie section in the southwestern part of the State. Of the three soil types represented two, the "Miami fine sandy loam" and the "Merrimac loamy fine sand," are among the more productive soils of this region. The third, the "Hinckley fine sand," is very unproductive. Originally the entire upland area within the tract was covered with an almost pure stand of oak in which the red, scarlet, and bur oaks predominated. Even on the better soils the trees were scrubby, and on the poorer soils mature trees were often less than 30 feet in height. Few trees at 75 years of age were large enough or of sufficiently good form to provide material for small sawlogs or railroad ties. Otherwise, firewood and fence posts were the only salable products that could be obtained.

The planting plan calls for converting the existing oak stand into a forest chiefly of conifers, retaining some of the oaks for the sake of improving the fertility of the soil and aiding in the natural pruning of lower branches from the conifers. Since the oaks sprout vigorously, they can be retained in the stand for many years without being given much attention.

The second purpose of the planting is to get information on the value of various conifers as species to be grown in the hardwood transition forests of Minnesota and Wisconsin, a region about 7,000,000 acres in extent.

On the poorer soils have been planted jack pine, Norway pine, the Riga variety of Scotch pine, white spruce, and Norway spruce. On the better soils these same species have been used, with the exception that Scotch pine of German and Swedish origin has been substituted for the Riga variety, and with the addition of northern white pine, blue spruce, western white spruce, balsam fir, eastern red cedar, northern white cedar, Douglas fir, and white ash.

On the poorer soils the most vigorous growth is being made by the jack and Scotch pines. Ten years after they were planted as 2–1 stock, trees of these species have reached breastheight diameters of 2 to 3 inches and total heights of 10 to 16 feet. The Norway pine made a slower start but is now growing vigorously; in 1928 its height averaged about half that of the jack pine planted with it, in equal numbers, in plot which these figures are based. On the better the northern white pine has grown faster than other species; 2–1 stock planted in 1915 reached in a maximum breastheight diameter of about 6 ir and a maximum height of more than 20 feet. No spruce planted at the same time in mixture with northern white pine was severely damaged by during each of the first four winters after plan but has now completely recovered and is growing as fast as the northern white pine, perhaps fa Norway pine, Scotch pine, and blue spruce ar doing well on these soils. The white and we white spruces have suffered heavy mortality subjected to severe drought in the first growing se in the field; but it is too early to pass judgment on t

Results obtained thus far with the plantation Lake Vadnais permit the following tentative clusions, applying to the hardwood transition fo of Minnesota and Wisconsin: Norway pine is the s species to use on all classes of soils; northern w pine, white spruce, and Norway spruce are satisfac for use on the better soils, and perhaps even on better portions of the poorer soils; a favorable growing season after planting is necessary if sp plantations are to be successful; jack and Sc pines should not be used until more is known a controlling their insect enemies; red spruce, ba fir, Douglas fir, eastern red cedar, and northern w cedar are not satisfactory species to use here for f planting, because of slow growth and low percen of survival; the survival of all species is much hi if the trees are planted in furrows plowed just b the planting is made than if furrows are not and some shade is a great help to the planted during the first season after planting, particu during droughts.

Department of Agriculture Adopts N Plant Name Standard

Standardized Plant Names, published by American Joint Committee on Horticultural No clature, has replaced Webster's Dictionary as standard for the spelling of common names of p in publications of the Department of Agricul One of the principles followed in this work is "whenever a common name properly belonging to genus is used as a name for a plant of some other g (unless rarely where very closely related) it is t used only as part of a compound name, written e with a hyphen or solid." While observing this ciple in general, the department will deviate from retaining the following well-established timber names: Western red cedar, eastern red cedar, sout red cedar, southern white cedar, northern white c southern cypress, incense cedar, Douglas fir, y poplar, and red gum.

eventh Southern Forestry Congress

m reports by C. F. Evans and A. B. Hastings, United States Forest Service)

ne Southern Forestry Congress at New Orleans and alusa, La., April 4–6, spent most of its time on ific problems of the southern timber grower. The ussion revolved around two main questions—one of h, how and to what extent is timber growing good ness in the South and what has been learned about rough experience; the other, what is the effect of ent methods of taxing timberland and what changes needed. The field day at Bogalusa was devoted to xamination of what the Great Southern Lumber has actually done about timber growing. The dis- ions and activities of this meeting provided strik- evidence that southern forestry has got down to s tacks and is beginning to drive some of them home. e than 300 representatives were registered for the gress and they came from all of the 16 Southern es. And in addition to the regular program, tings were held by various groups interested in the th's progress in forestry, including an all-day ion of the State foresters of the South on April 3 at ch these State officers formed a permanent organi- on, a conference of extension foresters of the South, a meeting of the southern section of the Society American Foresters.

he study of cases was kept before the meeting to unusual degree, as speaker after speaker told of his n methods of handling his timberland and of the ults obtained. George T. Houston, of the Houston mber Co., Vicksburg, Miss., described the method selective logging used on a tract of 23,000 acres of dwoods owned by his company, between 1893 and . In 1920 the company was able to resume ing operations on the tract and to obtain from it principal supply of timber for two band mills. n R. Thistlethwaite, of the Thistlethwaite Lumber ., Opelousas, La., told of selective logging on 11,200 es of hardwoods begun in 1907. The leaving of marketable trees, care in felling not to damage nding trees, and some fire protection were the asures taken. "As a result," said Mr. Thistle- vaite, "we have to-day a stand of valuable young nber that exceeds our expectation." A. L. Strauss, the Malvern Lumber Co. of Arkansas, stated that company is cutting to an 8-inch diameter in short- f pine where thinnings are needed, but are leaving es as large as 20 inches where the stand is thin. e company has cut over one tract for the third time, ting more than 40 per cent of upper grades, which s better than the production from virgin timber. provements in highways and secondary roads and velopment of truck logging, according to Mr. Strauss, s made this method of logging practicable. Henry Hardtner again described his operation at Urania, ., and papers were presented by L. R. Wilcoxon of Crossett Lumber Co., Crossett, Ark., and G. H. Lentz, special investigator for the Louisiana division of forestry while on leave from the New York State College of Forestry, covering somewhat the same ground as their articles in this number of the Forest Worker. James Fowler of Soperton, Ga., in a paper on "Protecting small areas," stated that he has 10,000 acres of the finest young pine in the South as a result of protecting his land in cooperation with the Georgia Forest Service and the United States Forest Service. He spends 12 cents an acre for firebreaks and considers he is well repaid for what he has done. He has stocked some of his protected lands with Mexican quail and has "more birds than he knows what to do with." The cases presented on the floor and the view of the operations at Bogalusa altogether made an impressive showing for southern timber growers.

The program covered, in addition to the points already mentioned, forest fire protection, the farm woodland, forest utilization, and the protection of forest range. General addresses on the forestry situation in the South included speeches by B. F. Smith, president of the congress. Senator Ransdell, of Louisiana, and R. Y. Stuart, chief of the United States Forest Service. In the discussion of farm forestry emphasis was placed on the advantage to the farmer of utilizing his own labor in marketing his timber.

The president of the congress in his opening address expressed the belief that in spite of the fact that some of the important original objectives of the congress had been reached the most important field of work lay ahead. Resolutions passed by the congress brought this out in a striking manner, one of them calling upon the Congress of the United States and the governors and legislatures of the 16 Southern States to provide adequate legislative and financial support for public forestry work. This resolution stated that only one-third of the 214,000,000 acres of private and public forest lands in these States is at present receiving any systematic protection, that funds available are entirely inadequate to protect even the relatively small acreage included in systematic protection areas, and that the public has a large measure of responsibility in the economic development of the great forest resources of these States. Another resolution embodied a plan for enlarging the organization of the congress so that it might function between meetings through the establishment of committees or groups in each of the 16 States, such committees to be responsible for informing the congress as to progress being made and as to programs of development needed by the several States. This plan will, it is understood, be considered at an early meeting of the executive committee.

A resolution on forest taxation advocated legislation providing for a reasonable annual tax on the value of the land alone during the growth of timber; a yield or a severance tax on merchantable products when cut, not exceeding 6 to 10 per cent of stumpage values for average conditions; specific contracts with owners of cut-over lands devoted to reforestation whereby the assessed value of the lands may be fixed for a period required to produce a crop of timber; and the amendment of State constitutions that include provisions preventing equitable readjustment of taxation on forest property.

Officers were elected for the coming year as follows: President, George T. Houston, George T. Houston Lumber Co., Vicksburg, Miss.; vice president, E. F. Allison, Allison Lumber Co., Bellamy, Ala.; secretary, R. S. Maddox, State forester of Tennessee; assistant secretary, H. B. Phillips, Hardwood Institute, Memphis, Tenn.; chairman of executive committee, Henry E. Hardtner, Urania, La. Memphis was chosen as the meeting place for the twelfth congress, to be held early in 1930.

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A new commercial forestry enterprise is reported from Arkansas, where the Missouri Pacific Railroad has arranged with James D. Lacey & Co. to institute forestry management on about 100,000 acres of its timberlands in the region north of the Arkansas River, between Russellville and Fort Smith. A survey of the tract and an inventory of the stands are now being made by Lacey men. It is planned to coordinate the fire-protection work with that on the Ozark National Forest, the lands being contiguous.

Some difficulty is involved in the institution of forest management on the Missouri Pacific lands because the lands occupy alternate sections and because they have been badly burned and overcut in past years.

National Park Legislation

An act of Congress approved by President Cooli in the closing days of his administration created Grand Teton National Park on lands lying west Jackson Lake, Wyo., that were heretofore a par the Teton National Forest. This area include portion of the Teton Range of mountains, which g it a scenic value much superior to its possibilities timber growing.

The appropriation act for the Department of Interior for the fiscal year 1930 carries a clause autl izing condemnation of private lands within national parks for purchase by the Governm (The authorization does not cover lands in Aca Glacier, Grand Canyon, Great Smoky, Hot Spri Platt, or Yellowstone National Parks that are occu by the owners and used exclusively for residence religious purposes.) The act provides $250,000 this purpose, specifying that this money shall expended only when matched by equal amounts c tributed for the purpose from other sources.

Another recent act of Congress authorizes Secretary of the Interior to investigate and report Congress on the advisability of establishing a natio park in southern Florida. Another authorizes appointment of a Yellowstone Park boundary comm sion to revise the boundaries between the park the adjacent national forests.

A bill that failed to receive the President's appro was that to create a national park in Arkansas lands now included in the Ouachita National Forest

Foreign Notes

Brazil Establishes Forest Service

Brazil is setting out to organize a Federal forest service, under the provisions of legislation that has been in existence for some years. In planning for the new organization the Brazilian Minister of Agriculture availed himself of the advice of William A. Orton, director of the Tropical Plant Research Foundation, Washington, D. C. In this connection Doctor Orton recently made a visit to Brazil.

The new service is to be headed by William Thomas Cox, for the past three years director of the Upper Mississippi River Wild Life and Fish Refuge of the United States Bureau of Biological Survey. Mr. Cox, a graduate of the University of Minnesota, had 7 years' experience with the United States Forest Service and was for 11 years State forester of Minnesota. Assisting him as associate forester will be Donald M. Matthews, professor of forest management in the School of Forestry and Conservation, University of Michigan. Professor Matthews, a graduate of the University Michigan, has had almost 20 years' experience tropical forestry work, in the Philippines and Brit North Borneo. Three years ago, as forester for Tropical Plant Research Foundation, he made investigation of forestry problems of eastern a central Cuba. Under his present arrangement w the Brazilian Government he will devote six montl time to an intensive study of Brazilian forestry c ditions while on leave from the University of Michig Mr. Cox expects to assume his new duties about July and Professor Matthews will probably leave for Bra early in August.

In discussing the importance of this step by Bra Doctor Orton says:

> Brazil is reported to have over a billion acres timberland, 100,000,000 acres of which is said be occupied by valuable pine. The Amazon Valley cc tains the greatest solid body of timber in the wor and the application of forestry principles to this gr

ion should have a profound effect on the timber rkets of the world. In Brazil are over 3,000 distinct ds of timber trees, and in the Amazon Valley alone er 2,000 have been reported. There are probably ny more trees of unknown species which, when ter known, will have great value and utility. Brazil a country wealthy in very high-grade woods, and first purpose of the forest service will be to put forests of the country on a perpetually producing is.

Brazil's present plans include sending students to forest schools of the United States to be trained, der the supervision of the Tropical Plant Research undation, for forestry work in their native land.

California Eucalypts and Pines for Planting in Turkey

Harold T. Pence, a graduate of the College of Agri-lture, University of California, has written as follows the problems he is now facing as director of agricul-re for the American Mission at Aintab, Turkey:

The country has in large part been deforested thin the last 50 years, as sheep and goats run at ge over the hills and valleys, and, of course, the l in many places is eroding very fast. Not only for is reason but also from the fuel standpoint, reforesta-n is of importance. We are starting a small nursery ourselves, in which we shall start several species of nes (including western yellow), several species of ks, manzanitas, laurel, and locust, as well as some tive shrubs. I am looking for a quick-growing tree ich will provide shade, windbreaks, and fairly hard od for charcoal burning, and which may be used as rests upon the hills. We have this problem to face: e country is underlaid by rotten limestone, in most aces less than 1 foot below the top of the soil, it must have a tree that can grow on the surface m wide-spreading roots. This high bedrock has e advantage which is well worth considering—the ne is always moist. This fact seems to me to be greatest factor in making dry farming possible on st of the land.

Seed of eucalypts and pines from California have en forwarded to Mr. Pence for trial plantings in urkey.

Treated Ties Give Good Service in India

Of 7,411 treated ties of chir (*Pinus longifolia*) laid in 915 in the Lahore division of the North Western ailway, India, none had been replaced up to 1927, cording to a report in the Indian Forester by W. A. ailey, timber advisory officer of the Railway Board, imla. The ties were treated in open tanks with a half-nd-half mixture of creosote and "earth oil." The verage life of an untreated chir tie, Mr. Bailey states, only about 3 or 4 years. Inspections in 1927 showed hat it had been necessary to replace 7 per cent of the 4,988 similarly treated ties laid in 1916 in the Lahore, erozepore, Multan, and Delhi divisions; 0.7 per cent f the 3,410 laid in 1917 in the Delhi and Quetta divisions; and 6 per cent of the 104,359 laid in 1918 in the Delhi, Rawalpindi, and Quetta divisions.

Irish Free State Regulates Timber Cutting on Private Land

Under a forestry law enacted in 1928 by the Irish Free State, landowners intending to cut down or uproot any trees more than 10 years old, other than fruit trees or osiers, are required to give the Government 21 days' written notice of their intention. The minimum penalty established for failure to give such notice is £5 for every tree cut down or uprooted; in cases in which the offense results from a bona fide mistake of fact the total penalty is limited to £100. The Minister for Agriculture is authorized to prohibit the felling or uprooting, and violation of a prohibition order is made punishable by a fine of not more than £5 per tree. A prohibition order can not apply to trees that are to be transplanted, trees in county boroughs or urban county districts, or trees within 100 feet of a building. Exemption is granted also in favor of fellings for the purpose of obtaining timber for the construction or repair of buildings, fences, or other structures on the holdings on which the trees stand or on neighboring holdings, or for the purpose of obtaining domestic fuel; this exemption is limited, however, to cases in which a tree is "not necessary for the ornament or protection of the holding on which it stands." Further exemptions apply in cases in which the revenue from fellings is obligated under the terms of loans for the purchase of the land, or of mortgages on the land, antedating the passage of the law.

An order prohibiting felling must be accompanied by a written statement of the reasons for the prohibition.

In granting a felling license the Minister for Agriculture may require that within a year or shorter period after the removal of a tree the tree be replaced by the planting of one or more trees of a specified kind.

When the minister makes a prohibition order with the view of preserving scenic beauty he may award compensation, if he is satisfied of the good faith of the intention to fell.

The minister may grant any person a general permit for thinning or clearing on any specified land either with a view to replanting or "in accordance with the general practice of good forestry."

The law requires that when anyone other then the owner of a woodland intends to burn shrubs growing within 1 mile of the woodland he shall give seven days' written notice of his intention both to civil authorities and to the owner of the woodland. If such notice is not given or if the woodland owner serves a counter notice objecting to the proposed burning as likely to cause damage to the woodland, the person burning the brush becomes responsible for any injury so caused and is subject to recovery of damages.

Canadian Forest Fires in 1928

Canada's losses from forest fires in 1928 are estimated at $1,328,950, as compared with an average of $4,463,581 for the 5-year period 1924–1928. During the year 4,259 fires occurred in the Dominion, burning over 1,347,170 acres.

In New Brunswick and Nova Scotia 6,451 acres were burned over by 234 fires, with losses estimated at $3,422, the lowest on record for the two Provinces. One factor in the reduction of losses was the wetness of the season. Quebec also made a low record. In Ontario nearly three times as much land was burned over as in the previous year; 86 per cent of the losses occurred in the Patricia district in the northwestern part of the Province, beyond the boundaries of the aerial patrol system. For Quebec and Ontario total number of fires was 831 and the acreage bur was 106,916. The Prairie Provinces, with an exc tional fire season continuing from April to the en December, had 1,050 fires burning over 1,109,881 a and resulting in a loss of timber and young gro estimated at $780,521. In British Columbia 2, fires were reported, of which 80 per cent were ex guished in the incipient stage. Here 123,912 a were burned over with a loss estimated at $271,185

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A nation-wide inventory of Canada's forest resou is planned by Minister of the Interior Stewart. premier of each of the Provinces has been invited cooperate.

Personals

Fred W. Morrell has been appointed chief of the branch of public relations of the United States Forest Service, succeeding to the position left vacant by the death of J. Girvin Peters in October of last year. Mr. Morrell, who is a native of Nebraska and a forestry graduate of the University of Nebraska, entered the Forest Service in 1906. He served as assistant district forester in charge of operation in the Rocky Mountain National Forest District for 12 years, and since 1920 has been district forester of the Northern National Forest District with headquarters at Missoula, Mont.

Evan W. Kelley, since 1925 chief of the Eastern National Forest District, succeeds to Mr. Morrell's post in Missoula. Mr. Kelley has been a member of the Forest Service since 1906, holding a number of administrative positions principally in California. During the World War he served in France for two years with the Forestry Regiment, being commissioned a major.

Joseph C. Kircher has taken over Mr. Kelley's former duties as head of the Eastern National Forest District organization, leaving the central office of the Forest Service after serving there for four years as inspector in the branches of operation and forest management. Mr. Kircher, a graduate of the Yale Forest School, has been a member of the Forest Service since 1909. His earlier experience was in technical and administrative work in the Southwestern National Forest District, with headquarters at Albuquerque. In 1923 he was sent to Rio de Janeiro in charge of the exhibit of the United States Department of Agriculture at the Brazilian Exposition. On the basis of information collected during his visit to Brazil he later wrote a bulletin on the parana pine lumber industry of that country, which was published by the Department of Commerce.

John S. Boyce, director of the Northeastern For Experiment Station, will join the faculty of the Y Forest School this fall as professor of forest patholo Before taking his present position in the early part 1928 Doctor Boyce was for eight years head of Portland, Oreg., office of forest pathology, Bureau Plant Industry.

Wade H. Phillips has retired as director of the No Carolina Department of Conservation and Devel ment, after serving in that office for three years. returns to the practice of law. His successor is J. Harrelson, formerly professor of mathematics of North Carolina State College. J. K. Dixon has li wise retired as assistant director of the department, is succeeded by J. S. Hargett.

William O. Edmondson has been appointed extens forester for Wyoming. Mr. Edmondson served dur the past year as agricultural agent in Wills Coun Colo.

Emanuel Fritz, professor of wood technology a lumbering in the University of California, and A. Recknagel, professor of wood technology, forest ut zation, and forest management in Cornell Universi are the principals in an exchange of professors agr upon by the two universities. Professor Reckna will teach at the University of California during fall semester of 1929, and Professor Fritz will teach Cornell during the spring semester of 1930.

A. R. Watzek, of Portland, Oreg., and Sol Reed, Shelton, Wash., have been appointed members of Pacific Northwest Forest Research Advisory Coun succeeding Russell Hawkins and Frank H. Lan whose terms have expired.

Crosby A. Hoar, forest inspector in charge of State peration in fire control and distribution of forest nting stock in the Rocky Mountain National Forest strict, has been made assistant district forester in rge of that work in the newly organized Lake tes National Forest District. W. F. Ramsdell, istant in the office of forest management, North cific National Forest District, has been transferred to new district as assistant district forester in charge forest management and lands.

The Central States Forest Research Advisory Coun- recently came into existence with a membership of appointed by the Secretary of Agriculture. The ncil will advise the Department of Agriculture as to orest-research program to be followed by the depart- nt in Ohio, Indiana, Illinois, Kentucky, Tennessee, va, Missouri, and northern Arkansas, and will work stimulate and correlate forest research by different encies in that territory. Its personnel is as follows: B. MacDonald, Iowa State College of Agriculture, nes, Iowa; Frederick W. Dunlap, State forester, lumbia, Mo.; Stephen A. Forbes, chief, Natural story Survey of Illinois, Urbana, Ill.; Edmund crest, State forester, Wooster, Ohio; Ralph F. Wilcox, ate forester, Indianapolis, Ind.; R. B. Miller, chief ester, Illinois Department of Conservation, Spring- d, Ill.; Stanley Coulter, Indianapolis, Ind.; R. T. uk, vice president, Meade Pulp & Paper Co., Day- , Ohio; W. M. Stark, president, American Column Lumber Co., Columbus, Ohio; E. N. Transeau, irman, botany department, Ohio State University, lumbus, Ohio; R. S. Maddox, State forester, Knox- le, Tenn.; W. E. Jackson, jr., State forester, Frank- t, Ky.; William T. Culver, manager, James D. Lacey ., Chicago, Ill.; Charles H. Barnaby, Greencastle, .; Joseph E. Pfleuger, Enterprise Manufacturing ., Akron, Ohio; C. Vivian Anderson, Cincinnati, io; Charles E. Hearst, Des Moines, Iowa; C. A. er, Columbus, Ohio; Paul C. Stark, Louisiana, Mo.; rl C. Smith, Chicago, Ill.; and R. W. Brown, presi- t, Missouri Farm Bureau, Carrollton, Mo.

James D. Kennedy, who has been assistant State der of blister-rust control in New York, is now a mber of the extension staff of the New York State llege of Forestry.

L. J. Leffelman has left the Ohio State Forestry partment, with which he was connected as assistant ester in charge of research, to go into private work as onsulting forester. He has taken charge of a com- rcial forestry project on the Hillcrest Plantation ate of Walter C. White at Sumter, S. C. Here he ends to institute forestry management on native odlands including 6,000 acres of swamp hardwood d now being cut over, reforest from 5,000 to 6,000 es of land consisting principally of old fields, and se some surplus planting stock for sale. This ing he has planted 175 acres of the estate with g-leaf pine seedlings and has begun work on a rsery.

George H. Cecil has resigned as supervisor of the Angeles National Forest, Calif., to become executive secretary of the Los Angeles County Conservation Association, affiliated with the Los Angeles Chamber of Commerce. Mr. Cecil's membership in the Forest Service dates from 1903; before taking his recent post in California he had been stationed at the central office of the service in Washington, D. C., and at Portland, Oreg.

William V. Mendenhall succeeds Mr. Cecil, and is succeeded as supervisor of the Santa Barabara National Forest, Calif., by S. A. Nash-Boulden, supervisor of the San Bernardino National Forest, Calif. J. E. Elliott succeeds Mr. Nash-Boulden, leaving the supervisorship of the Cleveland National Forest, Calif., to L. H. Anderson, heretofore assistant supervisor of the Angeles.

Alvin G. Whitney has resigned his assistant professorship in the School of Forestry and Conservation, University of Michigan, to accept the position of assistant director and secretary of the New York State Museum, at Albany, N. Y. Before going to the Michigan school in 1927 to organize its work in forest zoology Mr. Whitney was connected with the New York State College of Forestry as professor of forest zoology and assistant director of the Roosevelt Wild-Life Forest Experiment Station. His work at the New York State Museum will be chiefly administrative, including collaboration in planning and directing field research.

Officers recently elected by the National Shade Tree Conference are, president, H. H. York, forest pathologist of the New York Conservation Commission; vice president, A. F. Burgess, in charge of the gipsy-moth laboratory at Melrose Highlands, Mass.; secretary-treasurer, Rush P. Marshall, in charge of the Federal forest-disease laboratory at Yale University.

Secretary of Commerce R. P. Lamont has accepted the chairmanship of the National Committee on Wood Utilization.

J. B. White, Montreal lumberman, is the new president of the Canadian Forestry Association. During the war Mr. White commanded the Canadian Forestry Corps in France and became deputy director of forestry with the Imperial Armies with the rank of brigadier general. He is an officer of the Canadian International Paper Co. and several other lumber and power concerns. In 1928 he was president of the Canadian Lumbermen's Association.

Charles Wilkinson, for three years a member of the executive staff of the association, has been appointed its manager for British Columbia.

John D. Sutherland, assistant forestry commissioner for Scotland, has been elected president of the Society of Foresters of Great Britain. R. S. Troup, Oxford, is vice president, and R. Angus Galloway, Edinburgh, is secretary and treasurer.

John H. Hatton, chief of range management in the Rocky Mountain National Forest District, has been appointed editor in charge of the wild-life and recreation section of the Journal of Forestry.

George M. Gowen has been promoted from the position of assistant supervisor of the Lassen National Forest, Calif., to that of supervisor of the Trinity National Forest in the same State. Frank Price, whom he succeeds, has been transferred to the supervisorship of the California National Forest.

Officers elected by the Western Forestry and Conservation Association at its annual meeting in Seattle March 18–20 are, president, A. W. Laird, Potlatch, Idaho; vice presidents, W. C. Lubrecht (for Montana), C. A. Barton (for Idaho), C. B. Sanderson (for Washington), George B. McLeod (for Oregon), and C. R. Johnson (for California); secretary-treasurer, C. S. Chapman.

H. J. Eberly, for five years chief of the division forest protection of the Texas Forest Service, l resigned to accept a position with the Oregon St Board of Forestry. His work in Oregon will be co nected with the administration of the forest taxati law recently enacted there.

J. E. Lockwood, of the Hercules Powder Co., is t newly elected president of the Pine Institute America. Carl Speh is secretary and S. H. Berg, the Peninsular Naval Stores Co., is chairman in cha of local arrangements for the 1930 annual meeting the institute, which is to be held February 20–22 Jacksonville, Fla.

C. Stowell Smith, who for the past 12 years has be secretary of the California White and Sugar Pine Man facturers Association, has resigned that position a is now working in Washington, D. C., for the Natio Lumber Manufacturers Association.

Bibliography

Hanzlik's "Trees and Forests of Western United States"

By W. A. Dayton, United States Forest Service

Under the title "Trees and Forests of Western United States" there has recently appeared a 128-page book by Edward J. Hanzlik, of the North Pacific district of the United States Forest Service, which has its headquarters at Portland, Oreg. The book is prefaced with a biographical note by John D. Guthrie, chief of public relations of the same district.

In his foreword Mr. Hanzlik states that the book is based upon a series of monographs on western commercial trees which he has published in the Four L Lumber News of Portland, Oreg., the journal of the Loyal Legion of Loggers and Lumbermen. The book consists of eight chapters: Trees and their growth, classification of plants, the western forest regions, forest statistics, the western national forests, tree descriptions, Pacific coast hardwoods, and uses of western woods. Nearly two-thirds of its bulk is made up by the sixth chapter, "Tree descriptions," which contains notes on 25 important commercial conifers of the West. These notes are well digested and cover in small compass a surprising amount of information on the species concerned, including English and botanical names, area and location of commercial stands, size, history, range and occurrence, forest type, associates, growth conditions, reproduction, properties and uses of wood, and enemies—especially fungi, insects, and fire. The seventh chapter, "Paçific coast hardwoods," gives similar information for five commercial broad-leaved species. There is a type map of the region covered, a key to the genera and a key to the species of conifers represented, 14 yield and volume tables, 5 other st tistical tables, and a good index. The work is w illustrated with 19 botanical drawings and pho graphs, 12 drawings and photographs of wood, and other half tones.

The usage of Sudworth's Check List is carefu followed in both English and Latin nomenclatu save only that Rhamnus purshiana is called "casca sagrada" instead of the "cascara" of the Check L or the "cascara buckthorn" of Standardized Pla Names. "Cascara sagrada" is really the name of bark of this tree rather than of the tree itself; "casca which is the Spanish word for "bark" and is used combination in the nomenclature of many differe medicinal and other barks, is hardly a plant name.

Mr. Hanzlik has done his work so well that there little about it to criticize. Chief emphasis, natura enough, has been placed on the timber species of t Pacific States and Idaho; but the commercial speci of all the 11 far western States are satisfactor covered. Possibly if the title were changed to "Co mercial Trees and Forests of Western United State it would be more exact. A few typographical err have crept in, notably in the spelling of both comm and botanical names of Engelmann spruce in headin on pages 80 and 81. The book has been prepar more as a manual for the lumberman, the wood us the forest administrator, and the general public th as a college textbook; but its scientific basis is soun it is eminently readable, and it will make a useful a valuable reference work for research as well as f essentially practical purposes.

The book was printed by the Dunham Printing C Portland, Oreg.

onomic Aspects of Forest Destruction in Northern Michigan

By L. C. **Everard**, United States Forest Service

orest destruction has taken a course in Michigan is very similar to its course in other parts of the try. The State was chosen by the United States st Service for a study of economic effects chiefly use it is one of the States in which the more serious as of destruction had the earliest start and in which e has been time for the effects to become evident; because it affords one of the best examples of great ches of highly productive forest converted into land. In reporting the results of the study Spar- k and Brush, the authors of The Economic Aspects Forest Destruction in Northern Michigan, just ed by the United States Department of Agriculture echnical Bulletin 92, have used with unusual skill effectiveness two methods not easily combined—ific example and statistical comparison.

ot only is the bulletin an outstanding contribution the scientific and historical point of view, but parts are especially good reading because of the vigor- and suggestive style in which they are written and element of human interest which they contain. For ance "* * * in 1921 all that remained of ard (a lumber town established in 1901 with 00 acres of tributary timber) was a portion of a ken-down engine house and chimney of the sawmill, w unpainted shacks, a railroad station, a church, a boarded-up railroad hotel. The dozen or so ilies that remained were mostly connected with the road, which still ran one train a day in and out, ugh the settlers were then worrying lest the service e altogether and lest this compel them to haul in supplies over 12 or 15 miles of road that is almost assable during part of the year. The railroad, ch a few years before carried 80 carloads of forest ducts daily, in 1921 occasionally hauled as much as rs of lumber at one time. There were infrequent es of cleared land in the desert of stumps stretching y toward the horizon, but the chief topics of con- sation among the people along the line were the nces of finding work in the city and the question of re to go." Another instance is, "The depletion of l forests has been especially hard on the numerous ll factories making turned goods. * * * Thirty rs ago another village in the same section [northwest- Michigan] had large handle and cooperage factories a sawmill. Work was plentiful, the streets were wded on Saturday nights, and tradesmen prospered. w the timber is gone, the people are scattered, and iness is poor." A sentence describing the end of a road that depended chiefly on the timber for its enue is sufficient to give an idea of how this subject andled through specific example: "The track was lly taken up, leaving several hundred carloads of atoes, hay, grain, wood, and other products nded along the line, and leaving many square miles ountry without railroad service."

The statistical material is handled in such a way as to give a comprehensive picture of what the timber meant to the State and what its removal entailed. Carefully classified figures, the significance of which is brought out and made clear by numerous charts, are the basis for discussion of the effects of the removal of the forest on land use, community development, agriculture, railroads, forest and allied industries, schools and roads, taxation, interest rates, employment opportunities, and social conditions. In addition the bulletin contains a statement in regard to the original timber resources of the State, a history of the exploitation of those resources and of the settlement following lumbering, a study of the problem of idle land that now confronts the State, and a suggested forestry program.

The suggested forestry program is supplementary to what has already been done in Michigan, which is a good deal. State forests in Michigan now cover about 361,000 acres, and State and private expenditures for forest fire protection in 1927 were more than $335,000. Recommendations made as a result of the study are that the State's program include an enlarged system of State forests, promotion of forestry on the part of local public bodies (counties, towns, and cities), encouragement and assistance to private owners, provision for adequate fire protection for all forest lands, and a State planning commission that would include experts on forestry and land utilization. It is recommended also that the Federal forest land holdings in the State be consolidated and somewhat enlarged. The authors estimate that if the forest land of Michigan could be made fully productive it would give permanent employment to at least 100,000 persons and, counting their families, would support about 450,000 persons directly; indirectly it would support numerous additional people engaged in various trades and professions. "All told," the bulletin states, "it may be conservatively estimated that, with complete utilization, the forest land of Michigan would directly or indirectly support at least an additional million people."

The bulletin may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 25 cents a copy.

◆

A number of copies of English résumés of the following studies are available for distribution from the Office of Forest Experiment Stations, United States Forest Service, Washington, D. C.: The Significance of the Nitrogen Mobilization in the Raw Humus Layer for the Early Development of Pine and Spruce Plants, by Henrik Hesselman, and The Development of Mycorrhiza on Pine Seedlings in Various Forms of Raw Humus, by Elias Melin. These are translations by Paul W. Stickel of the German résumés of the two studies that appeared in Meddelanden Från Statens Skogsförsöksanstalt, Häfte 23, N:o 6–7, 1927.

Water Powers of California

By J. C. Dort, United States Forest Service

In his recent report to the Federal Power Commission Frank E. Bonner, district engineer of the United States Forest Service in California, presents a most comprehensive summary of the water-power resources of California, both developed and potential.

The bulletin begins with a discussion of physical conditions existing in the State of Claifornia, in which Mr. Bonner comments on the little-known fact that over practically two-thirds of the State's surface the topography is rugged, broken, and mountainous. He then develops the principal characteristics of rainfall and run-off in California, describing their variations in different parts of the State. Following this is a brief description, with tables, of existing water-power developments; a discussion of the market and of load characteristics; and an estimate of the State's potential water-power resources. The bulk of the report is given over to a full description of the resources of each drainage basin. Some very illuminating charts are presented showing how population, consumption per capita in kilowatt-hours, and electric load have increased in the past 28 years, with an extension of the curves forecasting future increases up to 1960. There are separate charts for northern and southern California and one for the entire State.

Among other things the author points out the significant fact that there is a great concentration of water powers in the northern part of California, but in the southern part of the State a lack of available resources to meet future requirements of the vast local market. For the additional hydroelectric power that it will need in the future it appears that southern California will have to look to the Colorado River. This river, with a potential average output of about 1,200,000 kilowatts, apparently is capable of taking care of the southern California demand for the next 50 or 75 years.

While highly statistical, Mr. Bonner's bulletin is written in an interesting style. It is illustrated with cuts of some of the more important power developments, maps of river basins, and diagrammatic profiles showing present and proposed installations.

This report is a natural follow-up of Hydroelectric Power Systems in California, by F. H. Fowler, former district engineer of the United States Forest Service in California, which was published in 1923 by the United States Geological Survey as Water-Supply Paper 493. The earlier publication recorded the beginnings and early history of hydroelectric development in California; this one brings up to date the summary of developed water powers, and describes the potential resources of the State.

Copies of this report may be procured from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 50 cents each.

A Comprehensive Volume on Rang Livestock Husbandry

By R. R. Hill, United States Forest Service

Livestock Husbandry on Range and Pasture,[1] Arthur W. Sampson, is a companion book to the s author's Range and Pasture Management and his Na American Forage Plants. The subject matter scope of this latest volume are summarized in preface as—

> the most approved methods of livestock dling on different types of forage; the suitab of breeds of stock to climate and food pl the habits and practical control of preda animals and forage-destroying rodents; and relation of livestock grazing to the propaga preservation, and management of game anir

The book is intended primarily as a textbook students in range management; but the author pected that it would serve also to increase the kn edge of stockmen concerning the management of herds, and their interest in improving range pract

Doctor Sampson's endeavor in preparing this ume has been not so much to present original mat as to provide a convenient digest of useful informa already available. The topics discussed include following: History of the livestock industry in United States; meat consumption and prospe meat supply; development of the principal breed cattle and sheep; methods of improving the grade livestock; chief characteristics of cattle and s affecting their adaptability to range and farm co tions; guides for the proper seasonal handling of stock; schedule of items in handling sheep throug the year on range and farm, with a brief descriptio the best practices, and discussion of diseases of and goats and their control; corresponding topic garding the raising and management of cattle; keeping and budgeting in livestock production (f are described that should be very serviceable to average stockman in keeping records of his expe and income); characteristics and means of contro the principal animals that prey upon livestock ar rodents that destroy forage crops; wild animal life recreation areas, and their relation to livestock pro tion; and reindeer production as a range industry.

Obviously such a large group of subjects could be treated in detail in one volume of 400 pages; the high lights of information regarding each su are adequately presented in popular style. The constitutes a well-rounded treatise. This first tempt to bring together in a single volume the prin information available regarding livestock husba on ranches and farms in the United States, mad an author who has devoted many years to the s nge and livestock management and who is highly liar with the literature on the subject, forms a valuable contribution to the literature suited for n forest schools and in agricultural libraries. The e of the volume as a textbook is considerably en-ed by the fact that at the end of each chapter the or has supplied a complete bibliography and a set estions and topics for discussion.

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[1] John Wiley & Sons (Inc.), New York.

New Manual of Minnesota Woody Plants

By W. A. Dayton, United States Forest Service

venteen years ago the University of Minnesota ished, as the ninth report of its botanical survey, a page manual entitled "Minnesota Trees and bs," by Profs. Frederic E. Clements, Carl Otto ndahl, and Frederic K. Butters. The two junior ors have recently revised, enlarged, rearranged, to a considerable extent rewritten this work. As result there has now been published under the "Trees and Shrubs of Minnesota" a State manual oody plants that is one of the finest both in con-s and in appearance. This sexto volume of 386 s, substantially bound in forest-green cloth, with ctive typography and paper, has a preface by . J. Arthur Harris; an introduction covering termi-gy, use of keys, pronunciation, and an outline of the t ecology of the State; keys to families and genera; ossary; and an index to both Latin and English es. The book is very profusely illustrated, with egetational distribution map of the State, line ings definitive of 42 botanical terms, 15 half tones ing trees and shrubs, and 271 drawings of tree and b species and varieties.

e body of the book, pages 27–365, consists of ly and generic descriptions, with specific descrip-s of monotypic genera, keys to species and varieties, distributional, phenological, and economic notes 7 families, 107 genera, 324 species, 40 varieties, 14 s, and 18 hybrids of native or introduced trees, bs, and woody vines occurring in Minnesota. hybrid cherry species are described as new and e new varietal combinations are published, two in a and one in Rubus.

is gratifying to note that in this new work biblio-hical citations are given and standard abbrevia-s are used for authors' names. The Vienna Code of enclature is employed, which results in the re-ding to synonymy of a few earlier names to which s of the American Code, such as the Federal Forest ice personnel, are accustomed; thus Shepherdia is tituted for the older Lepargyrea. In the main, botanical treatment is eminently conservative; in a cases, however, the treatment seems not altogether nonious. For example, separating the junipers two genera, Juniperus and Sabina, seems hardly istent with merging chokecherries, cherries, plums, and flowering almonds in one genus, Prunus, or uniting blueberries, whortleberries, and cranberries and their immediate allies in a single genus, Vaccinium. In view of the generally recognized variability in Virginia creeper (*Parthenocissus quinquefolia*), holding the rather feebly separable P. vitacea as a distinct species does not seem to be quite on all fours with reducing Lonicera glaucescens to varietal status under L. dioica. The two genera of Myricaceae are keyed apart (p. 86) solely on leaf characters; while these distinctions no doubt are the most obvious ones, is not the omission in this key of all reference to fruit and floral characters apt to give the inexperienced student the unfortunate impression that genera are sometimes delimited on the basis of the cutting of leaf margins?

It is pleasing to note the attention that has been paid in this volume to English plant names. Would it not, however, have been desirable to effect a closer correlation of this nomenclature with Standardized Plant Names and Sudworth's Check List? It seems to this reviewer that the authors of Trees and Shrubs of Minnesota might, in general, have profited by adopting the theory of Standardized Plant Names; witness, for example, the superiority in conciseness, form, and consistency of "peachleaf (versus "peach-leaved") willow" and "bigtooth (versus "large-toothed") aspen." Since the name salmonberry is so generally and uniformly applied to the Northwestern Rubus spectabilis, it seems that a protest may legitimately be made against the adoption of that name for thimbleberry, or whiteflowering raspberry (*Rubus parviflorus*).

An interesting and useful part of this book is the explanation of the Latin generic and specific names. In general these explanations are accurate and satisfactory; a few of them might be improved upon. The adjective "glabra" (under Aesculus and Rhus) is defined as "smooth"; it does mean smooth, but in the sense of "hairless," and a better definition is "bald" or "hairless"; a leaf may be glabrous and at the same time rough. "Strobus, the Latin name of some tree," is the explanation given on page 43 of the specific name of the northern white pine; "strobilus" is the classical Latin (Greek, στρόβιλος) word for pine cone, and is derived from a stem signifying "spirally whorled," whence there is an easy and obvious transition to the Late Latin word "strobus" first for pine tree and then specifically for the northern white pine of eastern North America. "Grossularia" (p. 149) is said to mean "like a small unripe fig"; a more precise etymology would seem to be that it is a Late Latin term for the gooseberry (from "grossula," Middle Latin for "gooseberry," cognate with French "groseillier"). In giving the name of the smoketree (*Cotinus coggygria*), on page 251, it is stated that the specific name is "unexplained"; the authors apparently have overlooked the fact that Pliny is thought to have meant the smoketree when he wrote of a dye tree called "coggygria" (variantly "coccygia" and "coccygria":

Greek *κοκκυγία*) native in the Apennine Mountains. "Negundo" (p. 266) is said to be "of uncertain derivation"; it is a Malayan name for the box elder. The specific name "polifolia" (p. 309) is defined as "smooth-leaved"; the best authorities seem to be agreed that this familiar specific name—which, it will be noted, is applied only to shrubs or other plants that have the under leaf surfaces conspicuously whitened or glaucous—means "white (or glaucous) leaved" and perhaps also contains an allusion to an old name for rosemary, a plant the leaves of which are whitened beneath. "Opulus" (p. 348) is said to be a "classical Latin name for a tree"; this name, cognate with French "obier," is a generic name in Tournefort for the European cranberry bush (*Viburnum opulus*)—which has maple-like foliage—and was used by Pliny for a species of maple. The authors define the Greek prefix macro- as "large," when its actual and primary meaning is "long"; however, scientists have persisted so long in the misuse of macro- for mega- (apparently under the misapprehension that macro- is the opposite of micro-) that this comment may have no practical significance.

On page 5 the two right-hand illustrations ("4") under the heading "Lobed simple leaves" seem to be compound leaves. The specific name in "Picea mariana" (p. 37) is explained as referring to Maryland, "where, however," the authors add, "this tree does not occur"; actually, black spruce occurs in the Allegheny Mountains as far south as North Carolina and is common in parts of western Maryland. When the name of cultivated jetbead (p. 169) was corrected from Rhodotypos tetrapetala to R. kerrioides (N. B. the "r" in kerrioides is doubled) there was a failure to correct the definition of the specific name. In general, the proof reading of the book has been carefully done; notable errors appear in the Engelmann spruce paragraph (p. 39), where Engelmann's name is misspelled three times, in the spelling of Amelanchier bartramiana (p. 219), and in the use of the English "Tamarisk" (vice Latin "Tamarix") on p. 286.

This fine new volume is published by the University of Minnesota Press at Minneapolis.

Slide and Film Strip Series on Soil Erosion

A series of 95 lantern slides supplementing Department of Agriculture Circular 33, "Soil Erosion, A National Menace," has been prepared by the Extension Service of the department in cooperation with the Bureau of Chemistry and Soils. Lecture notes to accompany the slides have been prepared by Hugh H. Bennett, soil scientist. The series is available for loan both on glass slides, many of which are colored, and on uncolored film strip. Requests for loans of the set should be addressed to the Office of Cooperative Extension Work, Department of Agriculture, Washington, D. C.

State Forester Reports on Forestr Work in Montana

Montana ranks fifth among the States in are State-owned timberland, State Forester Rutl Parker asserts in his report for the biennium en June 30, 1928. The State's timberland prop acquired under Federal land grants, amounts to 50 acres. Of this about 300,000 acres is now occupie merchantable stands of saw timber estimated to two and one-half billion board feet, and about 75 acres has been cut over during the past 35 years. remainder consists of burned-over areas and al protection forests.

During the past eight years timber cutting on M tana State forests has been restricted to trees ab 14 inches in diameter at breastheight in the cas larch and to trees above 16 inches in breasthe diameter in the case of western yellow pine. Parker believes that this cutting system, and servative slash disposal, will result in an average period of 80 years with a yield equivalent to the ave now obtaining in virgin stands.

Thus far the State forest department has made effort to limit the amount of timber cut on the S forests; but for the past five years, the State fore points out, the average cut of green timber has b almost identical with the expected sustained yi The absence of any limitation is due to the fact tha a rule the State timber is mixed with private holdi making up only a small part of the stumpage in logging unit. The only practical plan for harves State timber so situated is to have it cut by pri operators when they have installed their log improvements and are cutting the adjoining pri timber. Under these conditions the demand mus the limit of the amount to be cut. Furthermore, timber on many of the State areas is now overmat In addition, Mr. Parker observes, the lumber ma is depressed at the present time and it is not the in tion of the forestry department to force its proc upon an already glutted market. The State, un the private owner, since it pays no taxes can affor await higher stumpage prices.

Fire protection of the State forests is for the m part handled through cooperative arrangement private forestry associations and with the Un States Forest Service and the National Park Serv The cost of protection by the private associat averages 3 cents per acre per year.

Livestock grazing is an important and grow business on the Montana State forests. The fees received from western yellow pine lands are sufficien pay almost half the costs of fire protection on the S forests, and Mr. Parker expects that they will even ally equal these costs.

Practically all the forest lands in western Mont are now protected from fire. Most of the owner

ill tracts who had not sought such protection prior
927 through recognition of its benefits have become
nbers of protective associations since the passage in
t year of a law holding the owner of timberland re-
nsible for the control of any fire in forest material
ting on or spreading from his property unless the
perty is listed with a recognized protective agency.
The present tendency among loggers in Montana ap-
rs to be to burn too much rather than too little slash,
. Parker states in commenting on the operation of
slash-disposal provisions of the law of 1927. This
, replacing a law of 1919 under which it was required
t all brush or slash left from timber cutting be burned
otherwise disposed of within a year from the date of
ting, requires that fire hazard to the property of
ers created by slashings shall be removed by partial
complete disposal of the slashings, or by other pro-
ure, to the extent and in the manner required by
State forester, setting 15 cents per 1,000 board feet
as the maximum expenditure that may be so re-
red. Mr. Parker explains that under this law he
ects, on the average, disposal of the slash on about
-third of the area cut over. It is intended and re-
red that the brush be disposed of along all roads and
ning streams and at other points where fire lines can
established most economically and advantageously.
e object is to leave no slash area larger than 100 acres
thout a fire-control boundary.

Digest of State Forest Tax Laws

The Forest Taxation Inquiry of the United States
rest Service has just released as a progress report
ted April 15, 1929, a multigraphed digest of all the
ate laws relating to methods of taxing forest land
t differ from those followed in taxing other real
te. Accompanying the digest is a short historical
mmary of forest tax legislation and a tabular com-
rison of some of the important provisions of the
ferent laws.

The historical summary sketches briefly the move-
ent toward forest tax relief in the form of exemptions,
unties, rebates, and yield taxes that bore its first
uit with the enactment of an exemption law by Ne-
aska in 1866. The yield-tax plan of taxing forests
s not enacted into law until some time later, the first
v embodying such a plan being adopted by Michigan
1911. Today this movement is represented by 16
emption, bounty, and rebate laws and 14 yield-tax
vs on the statute books of 24 States.

The digest covers these laws and, in addition, the
endment to the constitution of California that
empts all immature forest growth from the property
x. To facilitate the study of the laws of the different
ates a uniform list of topics have been treated in
iform order, so far as applicable. Marginal numbers
the digest refer to these topics, which are as follows:
special classification; II, modification of the general
operty tax; III, new specific or other special property
tax; IV, yield tax; V, relief from other taxes; VI, contribution of the State to the towns and counties; VII, classification qualifications; VIII, general penalty provisions; IX, contract; X, amendments; and XI, special fire-protection provisions. The tabular summary, which makes it possible to compare certain features of all the laws at a glance, covers briefly topics II to VII, IX, and XI.

Copies of this report may be obtained by writing to the Director, Forest Taxation Inquiry, 360 Prospect Street, New Haven, Conn.

Science Popularized by a Scientist

(From a review by RAPHAEL ZON, United States Forest Service)

The literature devoted to the popularization or, as Robinson would put it, humanization of science has been enriched within the last few years by several notable contributions such as Will Durant's Story of Philosophy, Paul de Kruif's Microbe Hunters, and more recently Hunger Fighters,[2] also by de Kruif.

In Europe the best popularizers of science are the scientists themselves—men like the great physicist Tyndall, Huxley, and Haeckel. The clearest and simplest presentation of the theory of evolution is found in Darwin's own 2-volume work, The Origin of Species. Our scientists for some reason have usually considered it beneath their dignity to write about their findings in a style that would interest the average reader. Therefore books like Hunger Fighters, by Paul de Kruif, himself a scientist, mark a new departure in our efforts to popularize science. We hope that Doctor de Kruif's example may be followed by a number of his colleagues.

The book is not merely a story of the scientific discoveries that led to increasing the North American food supply. It gives a series of intimate biographies of men who through their work contributed immensely to the wealth and well-being of this country, yet who themselves remained in obscurity. Practically all the men described are of de Kruif's own generation. Many of them are still living, and many have been personally known to the author.

Although not a scientific treatise, Hunger Fighters will be very helpful to science in general. It does what many an official scientific publication and many an argument before a congressional committee on appropriations has failed to do—points out the tremendous social value of science. Convincingly and dramatically, de Kruif shows how scientific research enters into the life of the community and how intimately it affects the sufferings, struggles, well-being, and happiness of the people. The book should afford a great stimulus to the research men themselves, and especially to those working in forestry. What higher aspiration can foresters have than to emulate in their own field what the hunger fighters have done in the field of scientific agriculture?

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[2] Harcourt, Brace & Co., New York.

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ashington, D. C. JULY, 1929 Vol. 5, No. 4

State Forestry

nnessee Extends Its Program of Forest Planting on Farms

By R. S. Maddox, State Forester of Tennessee

n western Tennessee, trees from the State forest sery were planted this spring on private holdings every county but one. Seedlings distributed by State to farmers in that section numbered a little re than 200,000. This is a beginning that we hope in a few years run into millions. Only a nominal rge was made, and the State division of forestry t out men to assist in preparing the ground and ing the seedlings. These men will later visit the mers and instruct them in methods of cultivating seedlings the first year.

t was only in the spring of 1928 that the Tennessee vision of Forestry began to grow forest tree seedlings State-owned land. At that time we established a est nursery on a 38-acre tract near Jackson, in dison County. Madison County had thought well gh of our project for forest tree planting on farms purchase this land and deed it to the State for sery work and experimental planting.

Thus far the reforestation work conducted on Ten- see farms under the auspices of the State division of estry has been confined almost wholly to reclamation ntings on eroded areas. The division has gone on basis that on the gullied lands brush dams are essary in all cases. Therefore our work of reclama- n by tree planting has begun with the building of ish dams, followed by plowing off the gullied banks d then the intervening spaces. Planting is done the spring following this treatment. Hereafter, we ll extend our reforestation work to other classes of m land.

In our reclamation plantings the favorite species is ck locust. The division encourages the planting, o, of yellow poplar, black walnut, red oak, white k, and several conifers. This year we have sown in nursery seed of a number of coniferous species for perimental work, among which are northern white ne, Norway pine, red spruce, western yellow pine, Chinese fir, and Chinese cedar. The results from the setting of a very tiny area in Norway pine last year encourage us to look with a good deal of hope to this tree as a species valuable for reforestation.

In this spring's sowing in our nursery we used about 375 pounds of tree seed, mostly locust. From this we expect a production of from 500,000 to 1,000,000 seedlings. A Skinner sprinkling system assures rain when the seedlings need it. While these young trees are developing for next spring's planting, the field men of the division are engaging the interest of farmers in setting seedlings next spring.

One of the main purposes in the planting we are doing is to stimulate the interest of landowners in farm reforestation in general, by making them see that idle or waste land such as is now depressing the value of many Tennessee farms may be made a source of income. In this endeavor we now have the advantage of being able to point to a number of instances in which plantings not only have checked erosion but have quickly resulted in valuable stands of timber large enough for posts or approaching post size. A landowner in Henry County, in west Tennessee, who with the cooperation of the State division of forestry planted locusts in 1915 on land considered totally waste, reports that he is now selling posts from the planted area at the rate of $400 per acre. A badly gullied area in Williamson County, in middle Tennessee, planted with locusts through State cooperation in 1916, now has on it locust post material worth $145 per acre.

* * *

Under authority of the new Hewitt law, which provides for the establishment of productive State forests in New York, Conservation Commissioner Alexander Macdonald has approved contracts and options for 2,800 acres of land in the counties of Cortland, Chenango, and Otsego. The first area acquired under the law cost $3.45 per acre; some of the others have cost only $3 per acre. In general, the lands consist of abandoned farms lying on ridge tops at elevations ranging from 1,800 to 2,000 feet.

Florida Forestry Appropriation Greatly Increased

In the biennium beginning July 1, 1929, the Florida Forest Service will have nearly $5 of State money to spend for every $1 that was available in the preceding two years. Its former annual allowance of $12,500 has been increased by the legislature to $60,320. Funds allotted by the Federal Forest Service and by private property owners are expected to swell the board's annual budget to $150,000. The increase in funds will make it possible to expand the protected area by more than 1,000,000 acres, providing for at least 10 protective units in addition to the 7 now in existence.

Measures Proposed by Minnesota Reforestation Commission Stand and Fall

By **Crosby A. Hoar**, United States Forest Service

The Minnesota Legislature accepted only in part the series of forestry and conservation measures proposed at its recent session on recommendation of its interim reforestation commission. One of the conclusions which this commission reported, after a 2-year study in the course of which it conducted investigations and hearings not only in Minnesota but in several other States, was that the present functions of the commissioner of forestry and fire prevention, the commissioner of game and fish, and the commissioner of drainage and waters, and those of the State auditor relating to lands, timber, waters, and minerals, should be vested in a commissioner of conservation to be appointed by the governor. (At present the State auditor has absolute control of sales of timber on State land not reserved as State forest, and the State commissioner of forestry assists in the sale of State timber only as the auditor may request help.) Opposition was voiced to the inclusion in the proposed conservation department of the game and fish work and likewise to the inclusion of the mineral branch, which handles very valuable deposits of iron ore on State land. There was strong objection, also, to the organization of such a powerful department under a single director. These objections resulted in so many amendments to the measure that its essential purpose was destroyed, and the bill was withdrawn.

A bill proposing that the State pay an annual tax of 5 cents an acre on State forests to the counties in which the forests are situated was passed by the legislature but was vetoed by Governor Christianson. A similar bill had been passed and vetoed in 1927. A bill providing that the cost of managing State forests should be drawn from 50 per cent of the receipts from State timber sales was lost, as was one providing for a State nursery that would furnish stock to State forests and to State auxiliary forests.

Although these important forestry and conservat
measures were lost, several acts were approved
have an important bearing upon the future of forestr
the State. One of these amended the auxiliary fo
law, reducing the minimum annual land tax on auxili
forests from 8 cents per $100 valuation to 5 cents
acre. The amended law retains the additional ta
3 cents per acre to be expended by the State in
tecting the auxiliary forests from fire and the 10
cent yield tax upon forest products cut from
auxiliary forests. An appropriation of $40,000
provided for a land survey of northeastern Minne
to be made by the State commissioner of forestry
the agricultural department of the State universit

Provision was made for the purchase of State t
lands by the conservation department and for
exchange of lands so purchased for Governm
owned land within the boundaries of national fore
Minnesota law provides that State trust lands can
be sold for less than $5 per acre, and in exchan
between the State and the Federal Government t
lands would probably not be appraised so high
that. Hence, to clear the way for exchanging S
trust lands for Federal lands at whatever valua
may be agreed upon it is necessary that the S
appropriate money to free the land from its obliga
to the trust fund. An appropriation of $10,000
provided for this purpose, in order to make a s
exchange that will develop the necessary experienc
guide future exchanges on a larger scale. The le
lature made provision whereby a constitutio
amendment will be voted on at the next gen
State election authorizing the exchange of any of
public lands of the State, including lands held in t
for any purpose, for lands of the United States.

Control of white pine blister rust was pro
for in an act that authorizes the commission
forestry to designate blister rust control areas
requires landowners in such areas to carry out s
control measures as the commissioner may or
including the destruction of white pines and of cur
and gooseberry plants. If an owner fails to com
with the commissioner's order for the destruc
of plants the commissioner is to have the pl
destroyed, the expense becoming a lien upon
owner's land collectible in the same manner as ta
When control measures involve the destructio
white pines, or of cultivated currants or goose
ries, that are not infected with the rust, dam
may be paid to the owner. The State inspe
of nurseries is empowered to prohibit or regu
the shipment of white pines or Ribes into bli
rust control areas within the State.

A very important act was approved that aff
an example of State relief to counties overburd
with tax-delinquent lands. Several years ago ex
sive peat bogs in Beltrami, Koochiching, and I
of the Woods Counties were drained by mean
an extensive system of ditches. The counties is

ds to pay for the drainage, expecting to redeem n by means of ditch taxes assessed against pro-tive settlers upon the drained lands. Experi- has shown that most of the drainage was unwise that settlers can not farm the drained lands profit. Consequently a large area has become delinquent and the counties have approached point at which the bonds must go by default. as considered that the defaulting of bonds would only bankrupt the three counties directly involved endanger the credit of other counties and the State. Consequently the legislature took on whereby the State assumes the debt repre-ed by drainage bonds so far as delinquent lands concerned. To reimburse itself as far as pos- the State will establish on the drained areas reat game preserve in which game, fish, and sts will be fostered and handled for revenue.

alifornia Strengthens its Fire Laws

new law of California authorizes the State board restry, upon written petition of the owners of 50 cent of the forest land in any particular region or , to designate the region or zone a hazardous fire and prohibit smoking and the building of camp on it elsewhere than at points designated by the d. Another new California provision makes it a lemeanor to light or use a camp fire on another's without first obtaining a written permit from the er or his agent. The penalty is a fine of not more $500 or imprisonment for not more than six ths, or both. On property adjacent to territory er the jurisdiction of the United States Forest ice the requirement of a permit from the owner not apply to anyone who has a written camp-fire nit issued by the service for use on such territory who is complying with all rules and regulations of service.

he "ash receiver" bill introduced in the recent on of the California Legislature was passed by houses, but was not signed by the governor. The irement proposed by this bill was the following:

> very motor vehicle operated upon a public high- shall be equipped with a suitable container or ptacle for the disposition or reception of burnt ches, pipe ashes or coals, cigarette butts, and cigar s. Said container or receptacle shall be so con-cted as to prevent the accidental escape therefrom ny matches, ashes, coals, or butts placed therein.

◆

nder Idaho law it is now a misdemeanor to throw ed smoking material from a vehicle, or otherwise osit anything that may cause a fire, in any place re it may directly or indirectly cause a fire resulting lamage to forage on publicly or privately owned s.

California's Fire Control Budget

California has $208,685 of State funds budgeted for fire control in the fiscal year 1930, or 64 per cent more than in the preceding year. The new budget provides for additional man power in the more hazardous areas, several new lookout structures, and four fire trucks to be stationed at strategic points in the State. Since the general State emergency fund may be drawn upon in suppression emergencies, only a small proportion of the funds appropriated to the State forestry organization is budgeted for suppression. County cooperative funds also show a marked increase over those of the preceding year.

Southern California Association of Foresters and Fire Wardens

Southern California contains a large number of publicly employed foresters of three kinds—Federal, State, and county. In the belief that union will give them added strength for coping with the peculiarly difficult forest fire problems of the region, these men have organized as the Southern California Association of Foresters and Fire Wardens. The new organization will work toward standardization of fire-protection equipment and toward more effective handling of publicity and of educational programs. It hopes, also, to assist in bringing about greater uniformity of county fire laws. Complaint is made that the present variation among fire laws of different counties confuses the public and tends to cause misunderstanding of the value of such laws.

The area covered by the association's membership includes the counties of San Luis Obispo, Santa Barbara, Ventura, Kern, San Bernardino, Los Angeles, Orange, Riverside, and San Diego.

Frank E. Dunne, of Santa Barbara County, and Spence D. Turner, of Los Angeles County, the two county foresters through whose efforts the organization was formed, are serving as its president and publicity chairman, respectively.

◆

In the Southeastern Forest Protective Area of Mississippi, the number of landowners cooperating with the State forestry commission in fire protection nearly trebled in the year ending June 30, 1929. Two new lookout towers were built on the area during the year, and the telephone mileage was increased from 60 to 187. The average area burned over per fire, which in the fiscal year 1928 had been 252 acres, in 1929 was 126 acres. At a meeting held June 8, 1929, all the cooperators present, representing 85 per cent of the land listed for protection, signified their intention to renew their contracts with the forestry commission for the coming fiscal year.

Massachusetts Firewardens Get Together in County Associations

A spirit of cooperation is being developed among Massachusetts firewardens through county associations organized by the State conservation department. In Massachusetts the responsibility for protecting forests from fire rests primarily on local firewardens appointed by selectmen or mayors, one to each town. As evidence that the county associations of firewardens, which meet once a month, are correcting the isolationist tendency of this system Chief Forester H. O. Cook cites the recent publication of a forest fire fighting manual through collaboration of the associations in Barnstable, Plymouth, Norfolk, and Bristol Counties. The manual contains the forest fire laws, lists of all the wardens in the several counties and of the fire equipment owned by each town, a summary of typical court cases that have been prosecuted in these counties, and suggestions as to fire fighting methods.

Fire Truck to Attend on Land Clearing Fires in Minnesota

A new fire-protection service now provided in Minnesota by the commissioner of forestry is a fire truck to be used where farmers are clearing land by means of fire. The truck carries 200 gallons of water in galvanized-iron tanks. This water is available for use in 5-gallon hand pumps, or it can be discharged by means of a thresher pump that is always serviceable in refilling the tanks. A power pump is carried for emergencies. An experienced fire fighter has charge of the truck. Arrangements for its use are made through cooperation with county agents, who know which farmers need help in clearing land.

Illinois Saves Remnant of its Northern White Pine Forests

In establishing the White Pine Grove, a State park opened to the public in 1928, Illinois has given protection to a stand of northern white pine that is almost the only one remaining in the State. The grove is situated in Ogle County, about 7 miles from Polo. The Chicago and Iowa Trail bounds it on the south, and a little to the north of it is the main line of the Burlington Railroad from Chicago to St. Paul. Purchase by the State of this area of 283 acres, late in 1927, was the outcome of 30 years' agitation.

The 193-acre tract occupied by northern white pine lies at an elevation of 950 feet. Its soil is a rather deep sandy loam and is fairly well supplied with water. The trees are about 80 years old. Some of them have attained a height of 90 feet and a diameter of 27 inches. State Forester Miller expects that the cessation of grazing will result in the spreading of the pine
neighboring areas. His management plan inclu
setting pine transplants in openings, releasing you
pines by removing overtopping hardwoods, and remo
ing Ribes for protection from white pine blister ru

A picturesque feature of the park is Pine Cre
which winds through it in a deep bed of rocks.

Maine Buys Forest Protection Equi ment

The State of Maine this spring purchased 384 D.
Smith fire pumps for use in suppressing forest fir
With this addition there are about 1,000 of these pum
in use in the State. Each of the pumps is equip
with a 5-gallon can. In addition the State has p
chased eight 4-cylinder power pumps throwing
gallons of water a minute. Altogether there are
power pumps in use in the State, with 1,426 miles
telephone line, 77 lookout towers, and tools to eq
9,872 men. State Forester Violette is using cop
weld wire for some of his telephone work, and finds
satisfactory in service. The light weight of this wi
only 96 pounds to the mile as against 175 pounds
the galvanized wire usually employed, is a spec
advantage when the wire must be packed throu
rough country.

Michigan Adds 26,500 Acres to Pige River Forest

The Pigeon River State Forest of Michigan was m
than doubled in area in May of this year through St
purchase of 26,500 acres of forest lands in Cheboyg
and Otsego Counties. The newly acquired area
stocked with good second-growth timber and con
excellent game cover. The purchase brings wit
the State forest boundaries 20 miles of Pigeon Ri
frontage, 5 miles of Black River frontage, several sm
lakes, and a number of trout streams.

A New State Forest for Massachuset

An appropriation of $20,000 has been provided
the Massachusetts Legislature for the purchase
about 1,000 acres of land in the towns of Ashby
Townsend, which will be known as the Willard Br
State Forest. The land lies on both sides of St
highway No. 109, which leads from Boston to Pet
boro, N. H., via Rindge. Near the Ashby-Towns
line the highway follows for about 3 miles the cascad
mountain stream called Willard Brook, with
birch, hemlock, and laurel covered hillsides press
close on either side. The prospective State forest
about 55 miles from Boston, only 7 miles from the c
of Fitchburg, and close to other important centers
Worcester County. It is popular as a recreat
ground.

Tax Exemption for Immature Tree Growth in Connecticut

new law providing that immature tree growth be exempted from taxation has been enacted in necticut. The owner of land bearing such growth wishes to have it brought within the provisions of law may apply for an examination of the area by State forester. If after examining the area the e forester certifies that in his opinion it will be antageous to the community and to the owner to nit the tree growth to remain standing until suit- to be cut for lumber, the assessed valuation of area, including that of the tree growth, will remain ionary until the next general revaluation of real te in the town in which the area is situated. r such revaluation the tree growth will be exempt n taxation until mature. (Connecticut law requires ral revaluation of taxable property at intervals longer than 10 years.)

he law specifically permits any farmer owning ified land to cut from it such wood or timber as he need for farm use. No other provision is made egard to cutting.

ny certificate issued by the State forester under law may be revoked by him if he ascertains that land to which it applies is no longer being used for purposes contemplated in the act.

law already in force in Connecticut provides for sification of lands for timber growing and for ection of a yield tax on forest products cut from ls so classified.

Maine's Auxiliary Forest Law

aine has made provision for the establishment of liary State forests on privately owned lands capable roducing the equivalent of 15,000 board feet of wood or 8,000 board feet of hardwood per acre. ested lands, including forest plantations, are eligible is the owner's intention to use them for the purpose roducing fuel or of producing timber for manu- ure or sale. An owner's request that his land be uded in the State's auxiliary forests is to be directed he local assessors and the forest commissioner. If quest covering lands to be used primarily for the luction of timber for manufacture or sale is not nted by the assessors, appeal may be made to the st commissioner.

or the purpose of taxing auxiliary State forests ssors will appraise only the land and will appraise the same valuation as stripped forest land in the e vicinity, up to a maximum of $2 per acre. When s are cut from such forests for market or manu- ure a yield tax will become due at rates graduated rding to the year in which the trees are cut, as ws: First year, one-half of 1 per cent of the npage value; second year, 2 per cent; third year, 3 per cent; fourth year, 4 per cent; fifth year and thereafter, 5 per cent.

No yield tax will be due on timber cut for farm use by the owner or on timber cut to clear land for agriculture or for highway construction or similar purposes unless the wood is to be sold for fuel or used for manufacture.

The making of false returns under this law, refusal to make the returns within the specified period, or the cutting of trees from the auxiliary State forests contrary to the provisions of this act is punishable by a fine not exceeding $1,000.

Not more than 10 per cent of the area of a town can be admitted as a part of the auxiliary State forests in any one year if a protest is made to the forest commissioner by the assessors.

Land included in the auxiliary State forests may be withdrawn on application by the owner and payment of the tax on the full value of the trees thereon.

Mississippi Farmer's Planted Black Locusts Profitable

Black locust trees grown from sprouts transplanted in 1918 by D. C. Lawhon, a farmer of Verona, Lee County, Miss., are now 6 to 9 inches in diameter and 40 to 50 feet tall, Assistant State Forester H. C. Mitchell reports, or so large that they will each make from 10 to 15 fence posts worth 15 cents apiece. The sprouts, which Mr. Mitchell says must have been 2 years old when transplanted, originated from the stump of a little black locust in the garden of the Lawhon home. Eighty sprouts were transplanted to a thicket of scrub trees and bushes on a steep hillside bordering a creek. The planting site presented ideal conditions, with good water supply, good drainage, and a soil of deep, rich loam. No further attention was given to the transplanted sprouts except protection from fire. This spring Mr. Lawhon refused an offer of $1 each for the trees for use as telephone poles. Among the young trees now coming up from the seed of those transplanted, one 3 years old measures 2½ inches in diameter and is 15 feet tall.

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Crude white arsenic has proved effective as a protection against white grubs in seed beds at the Vermont State forest nursery at Essex Junction, State Forester R. M. Ross reports. Formerly the grubs did great damage to seedlings in this nursery. Mr. Ross began the use of arsenic three years ago, on the advice of H. B. Peirson, State entomologist of Maine, and has continued it ever since. He uses 80 pounds of arsenic to the acre. The arsenic is mixed with enough sand to carry it and the mixture broadcast on the beds. Being a powerful poison, it must be handled with care.

In this year's spring planting the Michigan Department of Conservation surpassed its previous record by 40 per cent. More than 5,000,000 trees were planted, on 8,500 acres of State forest land.

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New Jersey increased its distribution of forest planting stock by about half this spring, the increase being made possible by the availability of the first crop of seedlings from the State nursery at Washington Crossing. The total distribution of about 1,500,000 seedlings reached 500 planters. More than 1,000,000 of the seedlings were distributed to farmers and small landowners in lots of from 1,000 to 5,000.

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The Eureka Lumber Co., of Washington, N. C., planted pines on 20 acres of cut-over land this spring in cooperation with the North Carolina Forestry Division, which reports this as the first forest planting of any considerable size on holdings of a large lumber company in the eastern part of the State. The 21,000 seedlings used were mostly of loblolly pine, with some slash and longleaf. Assistant Forester F. H. Claridge supervised the planting.

◆

The 210 pounds of longleaf pine seed collected last November by the Texas Forest Service for sowing in the State nurseries cost about 56 cents a pound. The burrs were collected in Newton County from trees felled in logging and were hauled to the State forest by truck. There they were stored under cover and stirred at intervals until fully opened, when they were pitched about with a hayfork to shake out the seed. After being cleaned, the seed were stored in cans.

Studebaker Cooperates with Indi Division of Forestry

The Studebaker Corporation has given the Ind
Division of Forestry the use of about half of its
acre proving ground at South Bend, Ind., for f
planting experiments. This affords the division
opportunity to experiment in forest planting on
characteristic of the rolling glacial deposit of the
thern part of the State. The soil is a well-dra
gravel loam. In the plantings State Forester W
intends to use conifers, including northern w
Norway, Scotch, jack, shortleaf, Corsican, and Virg
pine, Norway and white spruce, and European
Japanese larches, and also to use some hardwo
Various species will be alternated on both the high
the low ground in order to find which ones are be
adapted for different elevations in the region.
variety of spacing will be tried, from 4 feet by 4 fee
8 feet by 8 feet. Planting was begun last fall, with
purpose of getting information on the results of fa
compared with spring planting.

The native woodland on the proving ground has
classified and is being managed according to the ad
of the forestry division.

◆

Correction: An estimate given in Cornell
versity's farm economics bulletin for Decem
1928, as to the rate at which farm land has
abandoned in New York State, was incorre
quoted in the article entitled "Two New York
estry Laws Approved Unanimously," by Paul
Kelleter, that appeared in the Forest Worker
May, 1929. The Cornell economists estimated
up to 1910 1,750,387 acres of land in New York
abandoned for farming, that in the period 19
1920 the rate of abandonment was about 140,
acres a year, and that in the period 1920–192
was about 270,000 acres a year.

Education and Extension

Summer Camp on National Forest for New Hampshire Forestry Students

The forestry department of the University of New Hampshire has been given a free use permit for a permanent summer camp on the White Mountain National Forest, N. H. The camp is located at Passaconaway, N. H., in the Swift River Valley, one of the most beautiful in the White Mountains. It is in the heart of the Swift River working circle and within easy reach of the Bartlett fuelwood area now being used by the Northeastern Forest Experiment Station; thus the students will be in touch with United States Fo
Service activities both in forest management and
silvicultural research. An opportunity for pract
study of road construction is provided by work on
road from Passaconaway to Bartlett, which will
going on for the next three or four years. A reside
that was on the land when it was acquired by
Government will be used as camp headquart
While in camp the students will be organized as a
in the fire-control system of the forest. This summ
students will be in camp, and in the future at least
are expected each year. The camp period will last
from six to eight weeks.

Four Forest Tree Flier Visits Communities in Southern Indiana

o stimulate interest in reforestation along its south-
Indiana lines, the New York Central Railroad ran
est tree flier over the Big Four route from Evans-
to Greencastle in the week beginning March 24.
planner and manager of the tour was R. J. Plaster,
ultural agent for the road; the forestry staff in-
ed R. F. Wilcox, State forester, and C. C. Deam,
rch forester, Indiana; E. M. Bruner, district forest
ector, United States Forest Service; and Daniel
Uyl, extension forester, Purdue University.

exhibit car was prepared by taking the seats out
coach, walling one side with beaver board, and
ructing a platform bed 30 feet long and 4 feet wide
iich was placed about 8 inches of soil. The beaver
l was painted, and on it were arranged posters and
educational material. In a portion of the bed
lisplayed a model of the State forest nursery show-
acking house, trees of different ages, and irrigation
other sections were occupied by exhibits of forest
ations, prepared with growing trees, indicating
species should be planted to produce posts, lum-
or Christmas trees. The car contained also an
it of forest fire protection equipment, displays of
and lumber and of wood finishes, and an Indiana
ry fact exhibit. Near the exit was a booth from
were distributed forestry bulletins of the Govern-
and of the State and booklets published by the
ican Tree Association.

efrigerator car was packed with 230,000 forest tree
ngs from the Henryville nursery, mainly pine and
e. A third car was used for lectures and confer-
, and a fourth housed the staff.

train's itinerary included 11 towns. The prac-
vas to make a half-day stop at each town, opening
ain for inspection and tree distribution from 8 to
the morning stops and from 1 to 5.30 for the
ioon stops. The lecture car was used for confer-
and for talks to small groups such as Boy Scouts
igh school botany classes. Visitors to the train
ered 4,501. Requests for talks elsewhere than on
ain were complied with whenever possible, and
s way 4,153 persons were reached. Talks were
ated with moving pictures and slides whenever
le. Demonstrations of planting methods were
by the forestry staff to the many persons who
d in the distribution of the train's load of planting
.

out two weeks before the tour began a poster show-
he itinerary and illustrated with a cartoon by
es Kuhn, of the Indianapolis News, was circulated
ghout the district to be covered. Radio station
F, Evansville, broadcast the news of the tour,
ning its purpose and giving the complete itinerary.
paper articles were sent by Frank Parish, publicity director for the Indiana Department of Conservation, and C. A. Radford, publicity manager of the Big Four route, to every newspaper in the State, and the tour received very satisfactory treatment both from newspapers and from farm journals.

Conference on Woodcraft and Forestry Teaching in Summer Camps

The Society for Protection of New Hampshire Forests is again at work in the interest of the thousands of children who flock to summer camps in New Hampshire and other States in the Northeast. At the invitation of Philip W. Ayres, forester of the society, a number of camp counselors met on June 18 at Camp Kehonka, near Wolfeboro, N. H., for a week's conference on the teaching of forestry and woodcraft in camps for children and young people. Participants in this conference included W. R. Mattoon, extension forester of the United States Forest Service; G. H. Collingwood, forester of the American Forestry Association; and E. V. Jotter, professor of forest administration and protection in the University of Michigan. Through the pooling of information and experience by those attending the conference there was brought together a body of material on summer camp forestry, hiking, and camping which Mr. Ayres plans to use in preparing a manual on the subject.

Professor Jotter will spend the summer visiting camps in New Hampshire as an itinerant advisor on forestry teaching. In this work he is employed cooperatively by the society and the owners of the camps.

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For the second time a short course in forestry is being given at the State Teachers College at Hattiesburg, Miss. The course, of 12 weeks' duration, began April 15 under the direction of J. F. Dubuar, head of the New York State Ranger School. In offering it the college has the cooperation of the Mississippi Forestry Commission.

❧

Farm forestry is to be a required subject for students of agricultural science in the Alabama Polytechnic Institute, Auburn, Ala., beginning with the fall of 1929. The required work will consist in a one-semester two-hour lecture course given by J. W. Hyde, assistant professor of landscape gardening.

❧

The 27-acre tract adjoining the campus of the University of Idaho that was leased by the university for several years for nursery and arboretum purposes has now been purchased by the university. This gives the forest school some 40 acres for its permanent use as a nursery and arboretum.

Ohio Extension Forester Starts Series of Demonstration Forests

In the five weeks beginning April 1, Extension Forester F. W. Dean moved rapidly over 25 counties of Ohio, leaving behind him a trail of newly planted demonstration forests. Mr. Dean followed a schedule arranged in advance with county agents, calling for 61 planting demonstrations on farms, at schools, and on city property set aside for municipal forests. He had no trouble making connections with the necessary planting stock, for the light truck in which he traveled carried a load of trees from the State forest nursery at Marietta. Other items in his equipment were a series of enlarged photographs of forest plantations in Ohio showing the development of the trees after periods of 5, 10, 15, and 20 years in the field, and a stock of bulletins on different phases of forestry work. The itinerary took the logical course from south to north, beginning in Jackson County, near the Ohio River, and ending in Geauga County, close to Lake Erie. Aside from the planting demonstrations, on this trip Mr. Dean made many farm visits and gave five forestry lectures before schools and civic organizations.

Demonstration Plantings at New York Fairgrounds

In connection with the State forestry exhibits shown annually at county fairs in New York under the supervision of George Stevens, the State conservation department has begun to establish demonstration reforestation plots at fairgrounds. Plots have been established at Cambridge, Chatham, Cobbleskill, and Altamont county fairgrounds, and are to be planted this fall at several others. Usually a strip about 40 feet wide and 100 to 200 feet long is planted with 3 or 4 year transplants of various species distributed by the State forest nurseries.

A feature of the forestry exhibits at fairs that arouses interest and has follow-up value is the guessing contest. A pile of pine cones is exhibited, and the person who makes the best guess in regard to the number of cones in the pile is given a prize of 1,000 little trees for planting.

Youthful Planters at Work in Minnesota

A municipal forest was dedicated by Ely, Minn., this spring, when the Ely Forestry Club planted trees on several acres of a hill adjoining the local golf course. The members of the club are high school and junior college boys. The planting was no unpremeditated affair, for the 3,000 4-year-old Norway pines used
been cared for by the boys in transplant beds si
1927. Extension Forester Parker O. Anderson wr
that the dedication exercises, held in Forest We
aroused much local interest. It is planned to c
tinue planting until this hill, which commands a v
of the city, is entirely forested.

This year 120 4-H club members were enrolled
Mr. Anderson for forest planting, which is a
4-H activity in Minnesota. More than 100 of
children will grow Norway pine seedlings, with
plan of transplanting them in a year or two and la
using them for farm shelter belts and woodlots.

Field Trip for Juniors in Idaho School Forestry

Eighteen juniors of the School of Forestry, Univer
of Idaho, left Moscow on May 19 for the field trip t
will hereafter be a part of the junior instead of
senior year's work in this school. The first destinat
of the crew was the headquarters of the Clearwa
Timber Co., 12 miles out of Pierce, Idaho. On
extensive logging operations of this company, wh
recently adopted a new diameter-limit cutting pl
the students were to lay out plots on which differ
systems of marking would be used with the view
determining their effect on the growth of the resic
stand, make time studies to determine operation co
and collect forest insects for laboratory study. La
the class was to move to the Northern Rocky Mount
Forest Experiment Station, near Priest River, Ida
where Gerhard Kempff, who resigned from the stat
staff in 1928 to become an associate professor in
Idaho school, would direct them in a study of some o
projects under way.

* * *

The first public school forests established in W
consin were acquired in 1928 by school districts
Forest County. The schools of Crandon received
acres of land for school forest purposes as a gift f
the Keith & Hiles Lumber Co., and those of Wab
received 40 acres from the G. W. Jones Lumber
During the same month an 80-acre tract was acqu
by the school district of Laona. School forests h
since been dedicated by the Goodman School, M
nette County, and the Cassian School, Oneida Cou

* * *

At Mountain Home, Ark., 4-H club boys and g
busied themselves this spring in planting black wal
on abandoned land and on scraps of idle farm l
such as fence corners and openings along creeks. T
plantings totaled 16 acres, County Agent H. D. G
reports.

restry Work by Los Angeles Public Schools

n teaching forest values and the destructiveness of st fires the public schools of Los Angeles, Calif., ke use of a 250-acre tract leased by the city on the geles National Forest. The land lies on the Clear ek branch of the Tujunga Creek, in the midst of a 00-acre area that was burned over in 1925. A camp been established with dormitory accommodations 48 boys. Boys above the sixth grade are brought in groups of about 20 from the various grade and n schools of the public school system, each group er the care of an agriculture teacher, to camp a ht and a day. While in camp each boy does at t two hours' work a day. During winter and early ng the work consists in planting trees; at other es it may be gathering seed, making trails and fire s, or extending the water system. Four hundred of seed beds 6 feet wide have been developed, all er an ample supply of water piped from a tributary yon. This spring the seed beds contained more n 10,000 1-year-old trees, mostly of Coulter and bcone pine; in addition 2,000 trees of the same cies in tar-paper pots were ready for planting. de from their tree-planting work, the boys collect scatter seed of chaparral species, in an endeavor to stitute more desirable species for those that form articular fire menace.

efore this plan had been in operation for three years ut 3,000 boys had done their bit at the reforestation ter.

t nearly 100 of the Los Angeles grade and high ools native trees and shrubs are propagated in cultural plots and gardens. Pupils are encouraged ke these trees and shrubs for home planting.

io Township Does a Good Job in Observing Arbor Day

Celebration of Arbor Day in Fairfield Township, umbiana County, Ohio, on April 26 was not left irely to the school children and their teachers. out 40 men of the community joined in planting s on the grounds of the township's centralized ools and on an adjoining area of several acres. The e men had given an entire day of the preceding k to preparing the ground. The planting was nged for on the initiative of the local parent-cher association and was supervised by Extension ester F. W. Dean and County Agent Floyd Lower. slopes and banks were planted 500 northern te pine and 500 Norway pine received from the te department of forestry, and near the school dings larger trees, including specimens of elm, sugar maple, white ash, and oak, brought by the pupils, were set for shade purposes. The celebration was completed with a picnic dinner and an afternoon program given by the school.

Intensive Forestry Activity at Milwaukee High School

A lively interest in forest conservation has developed in the Boys' Technical High School of Milwaukee, Wis., where for four years the students have been learning about forestry under the direction of S. W. Strothman. Mr. Strothman holds a master of forestry degree conferred by the University of Michigan, and before he became a teacher of science in the Milwaukee school was for five years a member of the United States Forest Service. In Milwaukee parks, thrifty plantations of evergreens testify to the correctness of the planting methods used by "Tech" boys in 1925. At the State teachers' convention the boys have distributed thousands of forest conservation pamphlets, and at both the teachers' convention and Milwaukee social centers they have exhibited 10-foot-square forest-area models of their own make, constructed with wood, screen wire, cement, and hand-carved trees, illustrating forest-fire losses and forest management. Hundreds of bird houses have been built by the boys and presented to the local chapter of the Izaak Walton League for installation on its wild-life refuge. The school weekly, the Craftsman, has given prominence to forestry subjects and in connection with the 1928 observance of American Forest Week published a 4-page forestry supplement. This spring the boys very successfully showed a "Keep Wisconsin Green" exhibit at the Outdoor Exposition held in Milwaukee May 4–10, the State conservation commission paying the expenses of the exhibit. Three hundred boys have been organized as the Boys' Tech Forest Service, each of them earning his membership by passing a test based on the American Tree Association's Forestry Primer. Various grades in this organization are attained by passing tests on Parts I and II of A Primer of Forestry, by Gifford Pinchot, learning to estimate and measure the diameters of trees, identifying tree species, learning correct methods of tree planting, etc.

A 10-acre plot of land near Wauwatosa belonging to Milwaukee County was set aside in 1928 by the county park board for use by the boys of the technical high school as a demonstration forest.

◆

Forest rangers of the Louisiana Division of Forestry expect to reach practically every boy attending a Boy Scout or 4–H club camp in the State this summer. Every ranger will visit a number of camps, spending several days at each, teaching the boys to identify tree species and to guard against forest fires.

Ohio 4-H Forestry Clubs Grow

In one year's time extension workers in Ohio have made two 4-H club foresters grow where but one grew before. Clubs in 12 counties of the State report 205 new members this spring. Seven other counties have such clubs. The new members accounted for the planting of 210,000 trees sent to them from the State nurseries at Wooster and Marietta, each member receiving enough 2-year seedlings to plant an acre of land. On the farms of Trumbull County alone new forestry club members reforested 60 acres.

Now that planting is off the calendar for this year the clubs are busy with tree identification and with plans for forestry exhibits at county fairs. First-year requirements of a forestry club member include the identification of 15 native forest trees of commercial importance in his home section.

* * *

High-school children in 11 counties of North Carolina were invited this spring to write essays on "Why we should conserve our forests and game," in competition for prizes offered by Assistant State Game Warden George A. Nicoll, of New Bern, out of his own pocket. In each county contest a prize of $5 was offered, and in the intercounty contest a prize of $10.

* * *

A permanent forestry exhibit is being installed in the State Capitol of Idaho, through cooperation of the State chamber of commerce, the State university, timber operators, and the United States Forest Service. Forest resources of Idaho and the locations of sawmills and power plants are shown by a large pictorial map of the State. Four large cases display models, pictures, and samples of the State's various wood products, and fire-protection equipment. Samples of wood of different timber species and of lumber of various grades are exhibited in racks, and 34 colored transparencies tell the story of the value of forestry to the State from the standpoints of lumbering, grazing, water-power development, irrigation, domestic water supply, and recreation.

* * *

An effective feature of an exhibit displayed last fall at the Eastern States Exposition, Springfield, Mass., by blister-rust control agents was a sign bearing Agent William J. Endersbee's slogan—

White pine will grow
Where the plow can't go.

Extension Service Promotes Planting Work in New York State

The spring planting season of 1929 found farm bur forestry committees on the job in 30 counties of N York State. With the aid of the State extens service these committees worked out forestry progra for their respective counties, and their efforts credited by Assistant Extension Forester Gillett w causing the planting of millions of trees on cou owned land as well as on idle acres of farms.

Nine hundred 4-H club members this spring claim the 1,000 young trees which New York State provi without charge to each boy or girl enrolling in a 4 forestry project outlined by the extension servi In counties where 4-H forestry clubs were active service held tree planting demonstrations, which w attended not only by club members but by 1,800 adu

County Agent Hires Audience for Forestry Talk

One way to assemble auditors for a farm fores talk is to hire them, County Agent A. G. Hendren proved in Wilkes County, N. C. Mr. Hendren been trying for several years to arouse an inter in woodland management among the farmers of Gilreath community, the North Carolina Extens Service reports, without succeeding in getting th to meet for a forestry talk. When Extension Fores R. W. Graeber recently paid a visit to Wilkes Cou Mr. Hendren asked 10 neighbors to come over w their axes and do a little work for him for hire. W cutting 10 cords of wood the farmers were expos the farm forestry idea so effectively that each o them agreed on the spot to undertake better mana ment of his woodlands.

* * *

In Susanville, Calif., where the headquarters of Lassen National Forest are located, forest officers h placed in the high-school library a show case contain fruiting bodies of common forest fungi and charac istic examples of decayed wood. Each specimen accompanied by a brief description giving the gene characteristics of the fruiting bodies and myceli outlining the life history of the fungus, and tell whether the fungus is found on living or on dead tr It is planned to change the exhibit frequently, show various subjects such as leaves and cones of comm coniferous trees, wild flowers and grasses, and ins with examples of their work.

Forest Service Notes

ve Years' Fires on the National Forests

n the 5-year period ending with 1928, fires on national forests were held down to an annual rage of less than one-third of 1 per cent of the total ional forest area. The California National Forest trict, afflicted with three bad fire years during the iod, suffered the most widespread burning; an rage of 1.083 per cent of its national forest area burned over in each year of the five. The next st unfortunate district was the eastern, with yearly ns covering an average of 0.867 per cent of its ional forest area. On the national forests that e in more than 20,000,000 acres of rain-soaked thern Alaska, the average proportion burned over ually in the 5-year period was only 0.014 per cent. ince 1919, a year when fire conditions were excep- ally bad in the northern Rocky Mountain region, year's fires have covered so much as three-fifths of er cent of the total area of the national forests.

orthern Pacific Land Grant Act Saves National Forest Lands to the United States

n act approved by President Hoover on June 25 noves from the operation of the land grants made by ngress to the Northern Pacific Railway Co. under act of July 2, 1864, the national forest lands that ve been involved in the controversy between the npany and the Forest Service, providing in this nection that the company shall be entitled to whatr compensation for the lands the courts may hold be due. The act declares a forfeiture of the unsatis- l indemnity selection rights of the company, and vides for the institution of court proceedings to ermine the disputed questions of law and fact t were considered by the joint committee of Con- ss which has been working on this case for five years.

◆

The fiftieth kiln-drying course of the Forest Products oratory, given April 1–12, 1929, had an enroll- nt of 14, including 11 industrial representatives, an pector of the Southern Pine Association, and repre- tatives of the Government of Finland and the iversity of Commerce of Stockholm, Sweden.

Tall Spruce Build Alaskan Salmon Traps

By J. M. Wyckoff, United States Forest Service

Anyone who is under the impression that the spruce forests of Alaska are dwarfed in comparison with those of the Pacific slopes in the States ought to see some Alaskan salmon traps. The salmon pack of southeastern Alaska is caught largely by means of a structure known as a floating trap, the frame or form of which is built of spruce logs. In order that they may be held in place on the rough coast throughout the fishing season, the traps must be constructed of the largest of logs. To construct one of the trap frames requires 15 logs ranging from 90 to 160 feet in length.

Full-tree logs suitable for fish-trap construction bring a much higher price than can be gotten for the same timber at the sawmills. Therefore it pays the logger to use care in felling and yarding so that he can offer logs of the lengths needed by the trapmen. Each year several million board feet of spruce are selected for fish-trap construction from the areas logged on the Tongass National Forest, Alaska.

An idea of the size to which Sitka spruce can grow in Alaska may be gathered from a tabulation of the size and volume of 15 spruce fish-trap logs cut from a total stand of 200,000 feet board measure on Prince of Wales Island, Tongass National Forest. These trees were yarded with a 60-horsepower Best tractor engine mounted on a donkey frame. The maximum haul was 900 feet. The dimensions were as follows:

Log length (feet)	Top diameter (inches)	Volume (board feet) Scribner Decimal C
88	33	6, 840
96	46	12, 110
108	26	6, 740
116	29	8, 900
120	27	9, 400
120	18	4, 990
130	26	5, 230
130	19	7, 110
136	16	5, 430
138	23	10, 280
142	20	10, 980
144	20	8, 210
144	16	7, 850
146	20	8, 960
158	17	13, 820
[1] 1, 916	[1] 356	[1] 126, 850
[2] 127. 7	[2] 23. 7	[2] 8, 456

[1] Total.

[2] Average.

Fires Long Ago

In the western yellow pine forests of the Southwest, on favorable sites where protection from fire and grazing is adequate there are fairly large areas of excellent young growth from 10 to 40 years old. Early explorers in this region described the western yellow pine stands as comparatively open, with no great amount of reproduction. The question as to why these forests, now proving their ability to develop heavy reproduction, were not reproducing on a similar scale 400 years ago, finds an answer in a reading of the stump of a western yellow pine felled on the Carson National Forest in 1923 at the age of 345 years. Walter J. Perry, while in charge of the Hallack & Howard sale on the Carson Forest, studied the stump of this tree and found that the tree had experienced 14 fires severe enough to scar its base. The years in which these fires occurred were 1629, 1663, 1682, 1705, 1718, 1748, 1758, 1796, 1810, 1817, 1824, 1839, 1844, and 1874. Thus the nonreproductive period of the forest in which this tree grew was distinguished from its present reproductive period by the frequent occurrence of severe fires.

Trees on Shifting Shores in Alaska

By J. A. Thayer, United States Forest Service

On the shores of Prince William Sound, Alaska, trees serve as indicators of the shifting relationships of sea and land surfaces. As early as 1794 the English explorer George Vancouver observed that the seas were encroaching upon the shores of the sound; the gradual subsidence of the shore line is now very noticeable, especially in the vicinity of Montague and Hinchinbrook Islands. At various points along the shores of the two islands there can be seen partially submerged remains of forests, the dead stumps standing in situ on the tide flats. As the land subsides the sea in many cases is building long, narrow bars or dykes of gravel along the seaward side of the bottoms, inclosing lagoons of brackish water. The tops of these bars are at about the level of the highest reach of the tides, and several feet higher than the flats where the dead trees stand. On some of the bars trees close to maturity have had from 4 to 6 feet of their stems buried by the continued accretions of gravel and débris washed up by the waves. Many of the bars support a growth of young trees, clearly denoting a recent extension of forest growth to newly built-up land.

At the head of Boswell Bay, on the easterly end of Hinchinbrook Island, a forest area of some 100 acres has been drowned out by the sinking of the land. Directly south and east of this area there has recently been built up an area of sand dunes, about 2 miles long and three-fourths mile wide. The side of the dune area farthest from the open seas is covered with a growth of pure spruce about 120 years of age, without any sign of older timber having occupied the ground previously. The age of the stand gradually diminish to seaward until within 200 yards of the sea only few scattered seedlings are to be found among t beach grass and willows. Evidently this area of du lands has been built up in not much more than 1 years and is still being added to.

In this place the rapid deposit of soil can be larg ascribed to the great amount of sediment borne to s by the Copper River and carried westward by the oce current. The sediment deposited by wave action formed into dunes by the strong easterly winds blo ing across the open Gulf of Alaska.

Grazing Versus the Pine Tip Moth

In a western yellow pine plantation on the Nebras National Forest, trees on a plot grazed by horses a cattle every year since the plantation was established 1920 have made better height growth than trees on a ungrazed plot. No specimens have been lost on eith plot. In June of 1920 the height of the 90 trees on th test plot averaged 19.1 inches and that of the 90 tre on the ungrazed check plot averaged 19.19 inches. I September, 1928, the average height was 57.82 inch on the grazed plot and 54.38 inches on the ungraze plot. Greater annual growth was made by the tre on the grazed plot in six out of the nine years. Th moths injured a greater percentage of the trees on th ungrazed than on the grazed plot in each of six out o the nine years, and over the 9-year period the averag annual percentage of trees injured by tip moths w nearly 4½ per cent greater on the ungrazed than on th grazed plot.

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Douglas firs grown at a density of only 40 per sq foot of seed bed and planted in the field as 2-yea seedlings have survived as well as the standard 1– transplants, in a test conducted on the Columbi National Forest, Wash., under the direction of J. I Kümmel. The seedlings were root pruned in plac at the beginning of their second year, at a depth o 4½ inches. Trees grown at a density of 80 per squar foot and planted on the Columbia and Rainier Nation Forests as 2-year seedlings had a mortality greate than that of 1–1 transplants by from 5 to 18 per cent— not enough to offset entirely the advantage of thei lower cost. Further experiments are being made i an effort to find a way to produce good Douglas fi planting stock without the expense of transplanting.

❧

The Southern Forest Experiment Station and th office of the district inspector for Clarke-McNar work in the Gulf States are moving about August from the customhouse, New Orleans, to the Ster Building, Baronne Street, New Orleans.

nmission Approves Purchase of 18,000 Acres for National Forest urposes

overnment purchase of 118,058 acres of land in Eastern and Lake States for national forest pur- s was approved by the National Forest Reser- on Commission on May 15. The purchase ram approved represents expenditure of $546,808, n average of $4.63 per acre. The largest tract ided is one of 93,764 acres in the new Osceola hase unit, in Florida. Authority was granted purchases adding 10,831 acres to the Superior onal Forest, Minn., 2,681 acres to the Alabama onal Forest, Ala., and 1,361 acres to the Monon- la National Forest, W. Va. Among other areas oved for purchase at this meeting of the commission 5,094 acres in the Georgia purchase unit, Georgia, nearly 3,000 acres in the Mackinac and Marquette hase units, Michigan.

ctric Drill and Dynamite Give Good Results in Felling Snags

ower boring and blasting proved not only much ker but decidedly cheaper than hand sawing as a hod of felling snags, in Forest Service experiments le in 1928 in the Wind River Valley of southern shington. The experiments were carried out main- on the Columbia National Forest, the forest on ch snag felling necessitated in 1927 by disastrous s of that year cost the Government $45,000. The s were performed by officers of the Columbia Na- al Forest and research men of the Northwestern est Experiment Station. The snags felled were ical of the Douglas fir region. Most of them were result of the 1902 fire. Nearly all were Douglas fir. majority were solid at the base except for the sap- d and spots of rot. Labor was figured at 48 cents hour, powder at $14.04 per hundredweight f. o. b. tland, and caps at $7.20 per 100.

o get figures on the cost of felling by hand sawing, e was kept on two sets of experienced fallers who e clearing the right of way of a new road. In the ng of 197 snags, the average cost of felling a single g was found to range from 30 cents for the 11–20- diameter class to $3.84 for snags having diameters rom 61 to 70 inches. In the opinion of foresters of Northwestern Forest Experiment Station, for fell- with the cross-cut saw on old burns these costs e probably above the regional average, because the und was rough, springboards had to be used on y trees, and 19 per cent of the snags were pitchy; on cut-over land where the snags are badly scat- d the sawing costs might be even higher.

On 90 snags near the place where the sawing tests were conducted a trial was made of felling by boring and burning. The boring was done with a portable electric drill and a 1-inch barefooted ship auger, driven by a 1½-kilowatt Delco generator mounted on an auto truck. Connection between generator and drill was by several hundred feet of electric cable mounted on a reel in the truck. The crew consisted of two men regularly employed on a road construction job on the Columbia National Forest. One ran the drill and one moved the truck, relaid the cable, and cared for the generator. The second man was busy in this experiment not more than half the time, and the boring could probably have been done more cheaply by one man. In each of the snags a horizontal hole was bored, and a sharply inclined hole was bored so as to meet it near the middle of the snag. Sometimes the two holes were bored from the same side of the snag; sometimes from opposite sides. When the fall rainy season made burning operations reasonably safe the bored snags were fired, by a variety of methods. In some cases gasoline, kerosene, or crankcase oil was poured into the hole and ignited; in some a charge of thermit was ignited in the hole, the flame of a Hauck torch was directed into it, or a lighted railway fusee was poked in. Fuels used in the holes included the following: Gasco briquets, kerosene or oil soaked shavings, kerosene or oil soaked charcoal, and pitch splinters. Charcoal, dry and combined with charcoal soaked in kerosene, was ignited in the hole by means of torch, fusee, or thermit. Most of these burning methods proved ineffective. Even with the nozzle of a Hauck torch held at the draft hole for half an hour, some snags failed to stay afire. Heavy oils in the hole made ignition almost impossible. Kerosene poured in the holes seldom gave permanent ignition. Thermit gave successful ignition on some damp and refractory snags but failed on others.

In the method found most satisfactory, two or three bits of charcoal saturated with kerosene are rolled down the vent hole so that they lie at the junction of the vent and the draft hole. Then with a small hand bellows a draft is forced through the holes. From time to time one or two pieces of dry charcoal are added. Sometimes reignition and tending become necessary. When trouble is experienced in starting the kerosen soaked charcoal, an inch of railway fusee is lighted a poked into the hole. Once ignited, the fire begi burn out a chamber and tends to back out the hole. If the draft hole becomes much enlar fire dies down and the effort to fell the snag b is almost certain to fail. For this reason, larger snags burned until they fell.

Of the 90 snags in this test 64 were act burning. In calculating the cost of fe and burning the expense of the work snags, including the tests made wi burning methods, was divided am

General Forest News

Survivals High in Plantations of Great Southern Lumber Co.

On practically all the cut-over areas planted with longleaf pine last winter by the Great Southern Lumber Co., Bogalusa, La., more than 90 per cent of the planted trees are living this summer. On some of the areas the company's forester, J. K. Johnson, finds survival percentages as high as 98. The winter's plantings reforested 7,009 acres of land, making use of 7,000,000 seedlings selected from among the 11,000,000 raised in the company's nurseries in 1928. At the present time the nurseries have a stand of 5,000,000 slash pine seedlings, which is expected to yield enough "No. 1" stock to plant 4,500 acres of denuded land.

In 1928 the Great Southern Co. achieved greater success in forest fire protection than ever before. The 303 fires that occurred during the season on the 425,000-acre area under protection burned 13,629 acres, or 3.2 per cent of the protected area. Half the fires were held to less than 10 acres.

Why the Western Pine Beetle Follows Fire

By J. M. Miller, United States Bureau of Entomology

On the Northfork burn on the Sierra National Forest, Calif., the Bureau of Entomology recently completed the most exhaustive investigation it has yet made into the reasons for the concentration of bark beetles on burns and the nature of the relationship between fire damage and bark-beetle infestation. The results indicate that the attraction of certain species of bark beetle to burns is determined largely by the degree to which fire injury suppresses the growth of surviving trees.

The fire that burned over the Northfork area on June 22-27, 1924, was typical of severe fires that develop in the border type of western yellow pine and brush areas on the western slopes of the Sierra Nevada Mountains. It covered a total of 5,460 acres, of which 370 acres was burned by severe crown fire, 1,300 by partial crown fire, and 3,790 by ground fire. Of a total stand of 19,111,000 board feet, 3.2 per cent was killed outright by the fire. The year of the fire was also a year of drought. On this burn, as on a number of others in similar type that have been kept under observation, a heavy concentration of bark beetl developed in surviving trees during the first t seasons following the fire. Before the close of the 19 season, an additional 3.5 per cent of the stand die mainly as a result of bark-beetle attacks on fire-injure trees. During the season of 1925, although the su viving trees started new foliage growth in the sprin a total of 3,698,000 board feet, or about 20 per cer of the remaining stand, was killed. In 1926 only 2. per cent of the stand was killed, the bark-beet infestation returning to an endemic condition in whic it remained during 1927 and 1928.

It was found that the beetles consistently selecte trees partially defoliated by scorching of the needle Trees with basal scars, due to the burning of one sid of the trunk near the ground, did not attract the unless this injury was accompanied by scorching the foliage and of cambium in the upper trunk. O the basis of sample-strip data the insect-caused mo tality in different classes of fire-damaged trees tha survived the fire was estimated as follows:

Class of injury and percentage of stand, by volum killed by insects

I. No fire injury	0.
II. Less than 25 per cent of crown defoliated	7.
III. 25 to 50 per cent of crown defoliated	51.
IV. 50 to 75 per cent of crown defoliated	7
V. 75 to 100 per cent of crown defoliated	44.

Class V contained a high percentage of young, vigo ous trees scorched by ground fires. These trees appa ently were not attractive to bark beetles. Class I which had a lower survival, contained a higher pe centage of large trees.

The western pine beetle (*Dendroctonus brevicom* Lec.) was the insect most largely responsible for t killing of trees subsequent to the fire, accounting f about 75 per cent of the total loss by volume. Co ditions in the fire-injured trees, especially in thos only partially defoliated, were found to be unfavorab for the brood development of this beetle. The rati of successful progeny to parent beetles was less tha that which usually occurs in attacks on normal tree It was for this reason, apparently, that an aggressi epidemic was not built up and the infestation subside as soon as the supply of trees rendered susceptible b fire injury was exhausted.

The cycle of western pine beetle infestation o adjoining areas was similar to that within the bur h an increase in 1924 and 1925 and a decrease in 26, although increase and decrease were both much aller than those that occurred on the burn.

t was found that a high percentage of the trees ected by the western pine beetle were trees that had de little or no growth since the fire. All defoliated es on the burn received a severe setback in growth a result of fire injury combined with the drought ditions of 1924. Of the trees attacked by bark tles up to the close of the 1926 season, 96 per cent l made little or no perceptible growth since the fire. ny of the heavily defoliated trees formed no per- tible growth rings in 1925 and 1926, although they out new foliage during these seasons; and those viving to October, 1928, formed only suppressed gs during the seasons of 1927 and 1928.

bservations made within the burn and on trees on ther area that were scorched by experimental rning show that the western pine beetle is not racted to fire-injured trees by odors, heat, or other mediate effects of fire. Heavily scorched trees did attract the beetles until several months after the occurred, or until the growth rate had become pressed as a result of defoliation by the fire. It is parent, therefore, that the degree to which this k beetle concentrates in burns of the western low pine type depends upon the quantity of defoli- d or partially defoliated timber that survives the tial fire injury.

mber Company Spoils a Meal for Bark Beetle

By J. E. Patterson, United States Bureau of Entomology

n an area near Aspen Lake, Oreg., that was burned r in June and July, 1926, the Weyerhaeuser Timber has demonstrated what a combined salvage and trol operation can do to prevent the usual intense centration of bark beetles in fire-injured stands and sequent high losses of merchantable timber.

he 8,000-acre area burned had a stand of western low pine estimated at 60,000,000 board feet. On ts of the area only a light ground fire occurred. On per cent of the burn the fire crowned and killed out- t more than half the trees, causing a direct fire loss 8,000,000 board feet. An additional 17,000,000 rd feet was severely scorched and damaged.

alvage operations were inaugurated on the burned a in the fall of 1926. In an effort to prevent a con- tration of bark beetles in the fire-injured stands, trol work was carried out in adjacent unburned nds. The control work was concluded the same fall l the salvage operations in the following season. out 1,500 acres of the fire area were logged. The 000,000 board feet of pine cut was milled on the n.

The results were highly satisfactory. A profit above the cost of operation was realized on the salvaged stock, and the combined logging and control work prevented a bark-beetle epidemic in the injured stands. Only a slight concentration of beetles took place on the burned area following the fire, and on adjacent areas where the control work was carried out the existing infestation was reduced to a pronounced degree. On untreated burned areas studied previously in the same locality heavy bark-beetle concentrations occurred immediately following the fires, infestation increasing after the fires by from 1,100 per cent to 1,950 per cent.

United Attack on Soil Erosion Problems Planned

Plans are announced by the Department of Agriculture for a concerted attack on national soil-erosion problems by the Bureau of Chemistry and Soils, the Bureau of Public Roads, the Forest Service, and various State agricultural experiment stations. The work is to be guided by a committee representing the three bureaus and the stations, headed by A. G. McCall, chief of the division of soil investigations of the Bureau of Chemistry and Soils.

A special appropriation of $160,000 has been made to the Bureau of Chemistry and Soils for soil-erosion studies. Experimental work carried on by this bureau to determine the susceptibility of various types of soil to erosion has indicated that 18 regional areas in this country present erosion problems so acute as to call for the establishment of erosion experiment stations. Most of the $160,000 appropriation will go into the establishment of seven such stations. The Bureau of Public Roads will continue to work on several of the engineering phases of erosion control. The Forest Service will continue its studies to determine how run-off, erosion, and stream-flow are influenced by forest cover, chaparral, brush, and range cover, and how far they may be controlled through fire protection and through forest and range management. In the South, efforts will be concentrated upon the loess soils of areas on both sides of the Mississippi River below the mouth of the Ohio. Somewhat similar studies will be undertaken in the Upper Mississippi Basin, in the loess soils of Minnesota, Wisconsin, and Iowa. Other special work planned by the Forest Service includes reporting the results of 14 years' experimentation on the relation of range management to run-off and erosion conducted at Ephraim Canyon, Manti National Forest, Utah. The service will also study methods of preventing the silting of irrigation reservoirs in Idaho and Arizona, and will expand the erosion investigations under way at the California Forest Experiment Station.

Planting on Long-Bell and Crown-Willamette Lands in the Northwest

By C. B. MORSE, United States Forest Service

When I visited the Longview, Wash., operation of the Long-Bell Lumber Co. this spring the mills there were running two 8-hour shifts four days a week and cutting 1,000,000 board feet of lumber to the shift. A year's cutting on this operation takes the timber from 2,000 or 2,500 acres. Yet J. B. Woods, forester for the company, told me that he is planting cut-over areas as fast as it becomes apparent that they will not be reforested naturally.

In the Long-Bell nurseries at Longview 1,600,000 trees are raised each year. Two-thirds of this stock is planted as 1-year seedlings; the remaining third is given two years in the seed beds. About 800 trees are planted to the acre. The species used are Douglas fir, Sitka spruce, hemlock, redwood, Port Orford cedar, and alder. At Longview both redwood and Port Orford cedar are a long way beyond their natural range, but both have given evidence of their ability to grow there. The alder is planted along the company's abandoned railroad grades, where it is expected in from 6 to 10 years to form an effective firebreak.

In the Long-Bell plantings at Longview, seedlings of saw-timber species are mixed in the rows with equal numbers of seedlings of pulpwood species. Douglas fir, for example, is alternated with Sitka spruce or with hemlock.

In 1928, although it was considered a poor seed year, the Long-Bell Co. collected and sold more than 6,000 pounds of seed of Douglas fir and other forest tree species, shipping seed to many foreign countries.

The Crown-Willamette Paper Co., at Oregon City, Oreg., is likewise doing a lot of planting. In the nursery which it established about six years ago this company is raising Sitka spruce seedlings at the rate of 1,000,000 a year. It plants about 400 Sitka spruce per acre, expecting that the light-seeded hemlock will seed in naturally so as to form a full stand. Present planting costs range from $8 to $9 an acre. The company expects to reduce the cost of its nursery stock to about $3 an acre and hold the total planting cost per acre to $8.

This company is experimenting in the growing of cottonwood for pulp timber.

* * *

In the Pulitzer prize awards of 1929 honorable mention for disinterested and meritorious public service in journalism was given to the St. Paul (Minn.) Dispatch and Pioneer Press for their 1928 campaign for conservation of Minnesota's forests and other natural resources. The twin newspapers were nominated for the prize by Raphael Zon, director of the Lake States Forest Experiment Station.

European Pine-Shoot Moth Discover in Florida

By PERKINS COVILLE, United States Forest Service

An insect found infesting immature cones of a lor leaf pine in Florida has been identified by Augu Busck, National Museum specialist on Lepidopte as the European pine-shoot moth. The identificati was made in Washington, D. C., on branch tips a cones from a tree on the Kingsley tract near the Stark Fla., branch station of the Southern Forest Experime Station. This tree had been used in cross-pollinati experiments, and removal of pollination bags from t flowers had disclosed the fact that a number of t small cones were badly infested.

Evetria buoliana, the European pine-shoot mot was first reported in the United States 15 years ag when it was discovered on Long Island. Since th time it has spread to the Middle Atlantic States a through the New England States to southern Canad This is the first time that it has been recorded sou of Washington, D. C. In the North it seems to confi itself in general to ornamentals, and has not becor a serious pest. In parts of Europe, however, it is a ve serious pest. Possibility of great harm resulting fro its activities in the South is suggested by the fact th the long southern growing season may enable it develop four or five generations a year.

Discovery of this insect on the Kingsley tract creat the suspicion that it may have caused the recent dea of certain trees on the tract. In March of this ye F. C. Craighead, in charge of forest insect investigatio of the Bureau of Entomology, and I examined four these trees without succeeding in determining t cause of death. The wood of the trees was sap-stain and the inner bark was alive with insects that entered since the trees' death. The foliage, some which was still green, seemed to have died back ur formly from the tips. Although the trees had bee dead but a short time, the buds were loose and we easily pulled off. The tissue at the base of the bu had been partially eaten away. Junior Forester L. Harper (who later discovered the insect) and othe had noticed for the last two years that in the vicini of Starke, although each cone crop seemed to make good start and develop well to a certain point, matu cones were abnormally scarce. Doctor Craighead d not find the damage upon the dead trees at Stark typical of that produced by the European pine-sho moth on northern species. Species like jack pine whe attacked by this moth develop a very irregular lead that grows crookedly back and forth, and that may sta alive for some time. At Starke no irregular growth the leader was noticed.

The larva or caterpillar of the European pine-sho moth is dark brown, with a deep black head and with black shield on the upper part of the first division of th body behind the head. Allied species are lighter i

r. The full-grown larva is two-thirds of an inch ength. The Department of Agriculture will appre- e full particulars on any discovery in the South of cts answering this description or of injury to trees h as that described in the foregoing. It is hoped t every one in a position to do so will watch for s of the insect and its damage and send any likely terial to Dr. F. C. Craighead, Bureau of Entomology, ted States Department of Agriculture, Washington, C.

Why Men Become Foresters

By F. H. Eyre, United States Forest Service

n an effort to find out something about the back- und, motives, and tastes of men fresh from school king Government employment in technical forestry rk, a simple questionnaire was circulated to 163 n recently graduated from forestry schools in the ited States who have applied for such employment 1929. A query as to the type of community in ich they were reared brought answers from 142 of men, revealing that 33 per cent of them were farm d as compared with 17 per cent coming from cities more than 100,000 population. Villages under 00 population had produced 9 per cent of the group orting, towns up to 15,000 population 31 per cent, d small cities 10 per cent.

Statements as to reason for choosing forestry as a fession that were definite enough to tabulate came m 108 of the men. These indicate love of outdoor as the predominating motive. More than one-fifth the answers gave actual experience in woods work the primary basis of the choice. Almost as many swers, none of them coming from farm-bred boys, tributed the decision to the romantic appeal of st life as experienced through reading and through y Scout activities, etc. Interest in conservation of rest resources and in natural sciences appeared as the ime motive in a few cases each. Correlated with pe of boyhood-home community, the motive answers assify as follows:

Motive in choosing forestry as a profession	Type of home community					
	Farm	Village	Town	Small city	Large city	Total
ove of the outdoors	12	9	13	8	3	45
arly experience in woods work, etc	17	4	3	0	0	24
omantic appeal of forest life as experienced through reading, etc	0	0	4	4	14	22
terest in forest conservation	6	1	0	2	4	13
terest in natural sciences	1	1	1	0	1	4
otal usable answers	36	15	21	14	22	108

In designating their preferred specialties in Govern- ent forestry work the 130 men who replied definitely this point indicated a wide range of taste. National rest administration showed a good lead over other types of work, forest surveying and research tying for second place. The 130 answers on this point classify as follows:

	Per cent
National forest administration	23
Forest surveys	15
Research	15
Timber management	13
Public relations	8
Recreational engineering	6
Engineering	6
Range management	5
Planting	5
Improvement construction	4
Total	100

* * *

Woodlot improvement can sometimes be combined with white pine blister rust control, writes T. J. King, blister rust agent in New Hampshire. In examining a portion of a pine plantation at New London, N. H., in 1925 Mr. King found 75 per cent of the trees infected with the rust. He suggested to the owner that pruning might save many of the diseased trees, as well as bringing about general improvement of the plantation. On reexamining the plantation in 1928 he found that pruning had saved two-thirds of the infected trees. The trees that could not be saved were those on which the disease had reached the trunk.

* * *

Sixty years ago the father of Senator Henry W. Keyes was troubled with the blowing of sand from a certain part of his property at Haverhill, N. H., writes Blister Rust Control Agent T. L. Kane. In high winds, sand would be scattered all over the estate. To correct this state of affairs, in 1870 the elder Keyes planted the sandy lot with northern white pines brought from a near-by pasture. As a result sand piles are no longer seen on the drives and walks of the Keyes estate and the planted area of about 1 acre now has a stand of beautiful pines about 60 feet tall.

* * *

The city of Asheville, N. C., made a start this spring in planting unforested portions of its 15,000-acre watershed holdings. The moving spirit in this undertaking was Miss Jane Oakley, who was formerly a student of forestry at the University of Minnesota. In this first effort about 35 acres of badly burned spruce land was reforested. Miss Oakley supervised the planting and also paid the labor costs. Spruce planting stock was supplied by the Champion Fiber Co., truck transportation and drivers by the city. Ranger Wilson, of the Pisgah National Forest, organized the planting crew and camping arrangements.

Protecting Rustic Structures from Insect Damage

Log cabins and rustic bridges and furniture can easily be protected from insect damage, the Bureau of Entomology tells us. Reports have been received by the bureau of beetles riddling with holes the bark on such structures and articles, and of larvæ mining the inner bark and so causing the bark to fall off or boring into the heartwood and causing great damage.

Timber to be used for rustic structures or articles should preferably not be cut during the spring or summer months, the season when wood-boring insects are active. If cut at that season the trees should be treated immediately after cutting with a solution of 1 part of coal-tar creosote (grade 1 liquid oil) to 3 parts of kerosene. Before this mixture is used it should be strained through burlap. When diluted in this way creosote stains the wood very little. If treatment of the bark with creosote is objected to and the bark can readily be peeled, it is suggested that the bark be removed from the tree in strips, the wood treated with the creosote and kerosene mixture, and the bark replaced and fastened with large-headed nails. Where it is not especially desired to retain the bark the trees may be felled at any time of year, although preferably in the fall, the bark removed, and the logs brushed with creosote, which will give them a pleasing stain.

If the trees are cut in the late fall or in the winter, the logs should be placed in open piles, either off the ground or under cover, in such a manner as to offer the best facilities for the rapid and thorough drying of the inner bark. Logs thus treated will be safe from the attack of most kinds of insects. For additional protection, the logs should be sprayed in the following spring.

When rustic structures and rustic furniture are attacked by insects the bureau recommends treating all parts of the bark and wood with liquid orthodichlorobenzene. This solution is colorless and will not stain. Its slight odor disappears after a short time. Great care must be taken to apply the liquid thorough in order that it may penetrate deeply enough to kill beetles and larvæ. Either a brush or a force sprayer may be used to apply the liquid. The spra ing method is preferable because it requires less ti and labor. One pint of the preparation will treat rustic chair, and 3 gallons is sufficient to treat 1 square feet of log surface.

In most instances the presence of the wood bor can be detected by the piles of reddish-brown or whit particles of boring dust which the insects push to outside in order to clear their galleries.

More Territory Covered by Woodgat Rust Quarantine Regulations

The quarantine regulations on account of t Woodgate rust have been amended to include Madis County, N. Y.

Two Asiatic beetles related to the Japanese beetle a the subject of a quarantine promulgated by the Secr tary of Agriculture on March 2. The area quarantin is coterminous with that now covered under the Japa ese beetle quarantine. The regulations are in gener of the same nature as those promulgated on accou of the Japanese beetle, but unlike them do not contr farm products. The two beetles concerned in th quarantine, *Anomala orientalis* and *Aserica castane* are important largely because of their capacity injure and destroy lawns and grasslands.

* * *

Sound white oak posts placed in the ground green ar unpeeled will last from 25 to 40 years in the Sou western States, according to observations of W. Long, forest pathologist of the Bureau of Plant Indu try. Small knot holes and cat faces in or near the grou shorten the life of the posts to from 15 to 20 years.

Foreign Notes

The Forests and Forestry of Suomi (Finland)

(From a booklet of that title by N. A. HILDÉN, Forest Research Institute Helsinki)

Suomi, Finland, is above all a country of lakes and forests. From the farthest forest outposts among the arctic mountains of Lapland right down to the shores of the Baltic, forest covers the whole country uninterruptedly.

The greater part of Finland belongs to the so-called northern pine forest climate. In the southern parts of the country there are milder regions in which the oak thrives, but in the extreme north the polar timber line runs through the territory of Finland.

Superficial deposit formed in the glacial peri covers the ground almost everywhere in Finlan giving it a slightly hilly, undulating appearanc Mountain slopes and rocks rise into view only he and there. In North Finland, however, the landsca often takes its character from the arctic mountain which sometimes raise their treeless tops to a height more than 1,000 meters.

Of the land area of Finland, 34,359,900 hectar altogether, 73.5 per cent is forest land. Waste lan composes 14.7 per cent. Among the countries Europe Finland is the most richly wooded from th point of view of proportion of area forested, and stan second as regards total wooded area. There are i Finland 7.4 hectares of forest per capita, which is siderably higher proportion than that of any other ropean country.

'he land is much less fertile in divide regions than on shores of the watercourses and on the coast. In latter regions forest growth is comparatively rapid contrast to that in the divide regions and particuy to that on the icy shores of the Arctic Ocean.

)n account of the comparative flatness of the ntry and because of the climate, the forest lands of land have tended to become swampy. Forest lands t have become swampy are estimated to compose per cent of the peat bogs which occupy no less than 7 per cent of the country's land area. On most of peat bogs some kind of natural forest grows, but ut one-fifth of them is quite bare.

'he country's most important species of trees are e (*Pinus silvestris*) and spruce (*Picea excelsa*). roughout the greater part of the country pine ests are most common. Spruce usually grows in most fertile districts. In parts of North Finland uce grows as the one prevailing tree.

)eciduous trees are less important than the conifers, nough birch (*Betula verrucosa* and *B. odorata*) ms extensive pure forests beyond the northern its of coniferous stands. In the southern parts the country birch appears nowadays mostly on unds that have been burnt for cropping purposes, where a forest fire has occurred. The same can be d of aspen (*Populus tremula*) and alder (*Alnus ana*). Many other deciduous trees are present the forests but are not of any great economic portance.

As a rule the forests in north Finland are old and en overmature; those in the South are mostly ddle-aged or young. The average rotation during ich trees come to maturity is considered to be 70–90 rs in south Finland, but at least twice that long in north.

The growing stock, including bark, amounts in all to 20,000,000 cubic meters. The annual increment of forests, not counting bark, is 44,400,000 cubic ters. It is estimated that pine makes up 48 per t of the growing stock, spruce 29.6 per cent, and ch 19.7 per cent, and that the annual increment is 4 per cent pine, 27.6 per cent spruce, and 23.2 per t birch.

In comparison with conditions prevailing in Central rope, for instance, the natural reproduction of ests proceeds quite successfully in Finland. Although the forests of the country have been dealt with anything but a tender way for centuries past—they ve been destroyed by forest fires, burnt for cropping rposes, and damaged by irrational cuttings—there comparatively few open spaces. It has sometimes ppened that a tree species less valuable from an nomic point of view, alder for instance, has become edominant; on the other hand, it is on burned grounds that the most beautiful and valuable forests of the country have sprung up. In most cases it is safe to depend on reforestation by means of natural seeding, if favorable conditions are provided by cuttings and other measures. It is due to natural seeding that mixed forests are very general. Mixed forests composed of coniferous trees and birch, in particular, occur frequently. The white birch trunks give the Finnish forest landscape what is perhaps its most characteristic feature, creating variety and beauty in the dark pine and fir forest.

The area, growing stock, and annual increment of the forests of Finland are distributed among the different ownership classes as follows:

	Land area		Growing stock		Annual increment	
	Thousands of hectares	Per cent	Millions of cubic meters	Per cent	Millions of cubic meters	Per cent
State	13,631.9	39.7	603	37.2	9.50	21.4
Private	17,908.0	52.1	820	50.6	29.00	65.3
Joint stock companies	2,217.0	6.5	157	9.7	4.79	10.8
Communes, etc	600.0	1.7	40	2.5	1.11	2.5
Total	34,359.9	100.0	1,620	100.0	44.40	100.0

State forestry activities are managed by a board of forestry subordinated to the Ministry of Agriculture. The State forests are divided into four districts, comprising in all 90 supervisor areas. The management of a supervisor area is entrusted to a supervisor assisted by assistant foresters, foremen, and rangers. Large trees for sawing purposes are usually sold standing, the buyer arranging for the felling. Smaller timber has to an ever increasing degree been delivered by the forest administration ready for sale at some suitable point of transport. The board of forestry also carries out a good deal of sawing in its own sawmills.

The smaller annual increment on the State forests as compared with private lands is due to the fact that the State forests are situated largely in the barren divide regions in the northern part of the country, and to the comparatively great average age of the State-owned timber. The State forests supply a considerable portion of the raw material requirements of the Finnish wood manufacturing industry, and constitute one of the most important sources of wealth and income of the Finnish State.

The private forests are divided among hundreds of thousands of owners. Owing to the cold climate and to the fact that there are no coal mines in Finland, such quantities of timber are required for building and heating purposes that agriculture would be unprofitable if it were not combined with forestry.

The forest law now in force prohibits the cutting of old forest unless provision is made for satisfactory regeneration, and prohibits any cutting of young forest other than rational thinning. The control of the observance of the law is entrusted to 18 forest conservation boards, to whom forest owners are obliged to report all fellings for sale.

Another important function of the forest conservation boards is to work for silvicultural improvement of the private forests, as by providing the forest owners with competent and cheap professional service and by rendering financial aid in forest management, particularly to small farmers. The boards also distribute among private individuals the considerable contributions and loans which the State has recently granted for draining peat bogs suitable for forest cultivation. Although established by law and receiving considerable State support, the boards base their activities essentially upon the voluntary efforts of the forest owners.

The lands in joint stock company ownership belong mostly to wood-manufacturing establishments that have acquired the lands to assure themselves of a supply of raw material. The forests of these companies are, as a rule, better managed than private forests.

The species of trees growing in the forests of Finland yield first-class timber material which, in manufactured shape, is in great demand in foreign markets. Finnish timber is very well known for its strength and durability, due to its comparatively slow growth. Further, timber transport facilities are favorable in Finland. There is a moderate fall of snow in the winter, when the felling and hauling of trees can be carried out even under difficult topographical conditions. During the winter timber is hauled by horses to the banks of innumerable rivers, streams, and lakes. At the breaking up of the ice in the spring the watercourses are everywhere ready to take over the transport of timber. For hundreds of kilometers the logs pass over roaring rapids, across blue lakes, and down powerful streams to the wood mills. These are usually situated along the coasts, principally at those places where large watercourses empty themselves into the sea. The continually extended network of railways completes the transport facilities offered by nature.

In 1927 the wood-manufacturing and paper industries employed no less than 47 per cent of all the industrial workers of Finland, and their productive output represented 46 per cent of the value of the whole industrial production of the country.

In general, the larger pines and spruces are converted by the sawmills into deals, boards, etc., while smaller spruces and the tops of the coniferous trees, as well as the coarse waste obtained in sawing, are made into pulp and paper. Birch is turned into plywood and spools, and aspen is sent to match factories. All kinds of less valuable trees, as well as mill waste, are used by the mills as one of the most important forms of fuel. The State railways are run mainly on firewood.

The value of forest products exported by Finla last year made up from 80 to 90 per cent of the tot value of the country's exports. The quantiti exported were as follows:

Sawn goods	standards	1, 146, 5
Round timber	cubic meters	3, 876, 3
Plywood	tons	82, 8
Spools	do	5, 5
Paper	do	243, 8
Chemical pulp	do	473, 0
Mechanical pulp	do	182, 9

England is the largest buyer of Finnish timbe Holland, Belgium, Germany, and France all buy considerable quantities. Many tens of thousands standards are sent annually to Spain, Denmark, an South Africa. Buyers of Finnish paper produc include, together with these countries, Russia, th United States, South America, and China.

The Swiss National Park

(From an article by G. D. KITCHINGMAN, Indian Forest Service, in th Quarterly Journal of Forestry [London])

In the Engadine, the Alpine valley that the Swiss ca "the Roof of Europe," Switzerland has a nation park of 35,500 acres. Some 30 years ago Swiss natura ists, alarmed by the way in which the spread of rai ways and industries was threatening the beauties their country, organized a society for the protectio of nature and became active in persuading local bodie to frame rules to protect wild flowers and certain sma areas. Soon they began to work toward the reservation of the Scarl Valley, which lies in the Engadin some 15 miles east of St. Moritz. By 1913 the society' membership had grown to 24,000, a remarkable numb for so small a country. Still private subscripti were not sufficient, for the area of reservation contemplated had spread to cover the whole of the presen park. In 1914 the Swiss Government agreed to pa an annual subsidy of 30,000 francs toward the expense and a 99-year lease was drawn up with the commune concerned. The park is now controlled by a commission to which members are appointed both by th Government and by the society. The society is responsible for carrying out definite research work and issuin an annual report. All plant and animal life is protecte and no commercial use of timber or forage is permitted

Lying in the southeast corner of Switzerland betwee the River Inn and the Italian border, this park is th meeting place of the flora of the western and that of th eastern Alps. The climate is comparatively dry, wit an average annual rainfall of less than 28 inches. Wind from the southwest generally reach the Engadine a desiccating winds, having dropped most of thei moisture in the French Alps. The park lies between altitudes of 4,500 feet and 10,400 feet. Its valleys are deeply cut. On a high-lying plateau of this kind variation between the mean summer and winter peratures is bound to be great on account of the eased insolation in summer and the intense radia- in winter. This southeast corner of Switzerland is tly Triassic Dolomite. The jagged tooth-like ks into which dolomite (magnesium limestone) thers, with masses of débris on their slopes, to- her with the results of a thrust from the southeast in Tertiary period that folded parts of the country a tiled roof, give the mountains a wild character sual in Europe.

ll the important tree species of Switzerland can seen in this park except the yew, for which it is too h, and the silver fir, for which it is too dry. The ountain" zone of vegetation, characterized in Central rope by mists and fogs and heavy fir forest, is not nd in the park. The next higher zone, the "subal- e," which generally starts at an elevation of more n 5,000 feet, is well represented. A subalpine e indicates much drier conditions than a mountain e, for it lies above the line of mists and fogs. Strong olation by day, low temperatures (especially of the) at night, and frequent strong drying winds pro- ce a habitat distinctly xerophytic (suited for plants ving low moisture requirements). In this park the rcity of moisture is intensified by the prevalence of dolomite, which like all limestones produces a r, thin soil.

he chief trees of this zone are Pinus silvestris and its al variety Engadinensis, Pinus montana, spruce, ch, and the arolla pine. Pinus silvestris does not w above 5,000 feet. This is said to be due to the t that its tapering root can not get a hold on rocky und. It does not like drought, but is indifferent to composition of the soil. It is found nearly always ixture with the larch, spruce, or mountain pine. e variety Engadinensis is more abundant in the park an the typical species, for with its more slender crown an better resist snowbreak. It is to be distinguished its thinner and less jagged bark and its cones, which fixed horizontally. Pinus montana, which is more rophytic than P. silvestris, grows up to 6,000 feet. can thrive on the dry barren limestone soil and often rocky slopes, and is resistant to wind and frost. It a pioneer species and very long lived, and is here aracteristic of dolomite soil. Spruce is common in the rk, and forms characteristically dense silent jungles. does not grow much above 5,000 feeet. As a rule it efers well-drained slopes facing west, avoiding dry ations. The larch, the most beautiful tree of the gadine, is well represented. Being deciduous, it can thstand the drier conditions and the damage from w and is consequently well adapted for the subalpine ne.

Most interesting of the trees in the park is the arolla e (Pinus cembra), which is called "the cedar of the Alps" and grows up to about 5,700 feet. Typical of the granite and gneiss soils, it forms only open forest, generally with an undergrowth of rhododendron. The isolated trees toward the higher limits of the species are stern, robust, majestic specimens, torn, twisted, and bent by the severity of the winds. This pine is often found in mixture with the larch, and, like it, is a pioneer species at these higher elevations.

Advancing from the subalpine to the alpine zone, we leave the forest to enter the high-lying pastures. Here we are amongst the vivid alpine flowers. As regards pasture grasses, it seems that with the decrease in grazing their condition is deteriorating and inferior grasses are getting a hold. Above the alpine zone come the "débris" and "rock" zones, with their scanty yet distinctive vegetation; and then the line of permanent snow, which in the park is at about 6,400 feet.

The Middle Ages saw the reindeer, elk, bison, and wild ox disappear in Switzerland. The ibex, which is the favorite emblem on the coats-of-arms of many Engadine families, followed in the beginning of the nineteenth century. By the end of that century the beaver, wild boar, bear, lynx, wolf, and lammergeier had become extinct. The last bear in Switzerland was killed about 1900. Under protective measures enforced by the park commission good increases have been made in the park by the red and roe deer, the snow partridge, and the capercaillie. An increase has been shown also in the number of chamois, which in 1927 stood at 1,512. Eight ibex brought from Italy, where a herd of more than 2,000 is kept in the royal Grand Paradis reserve, were introduced into the park in 1923 and by 1927 had increased to 17.

Plant Life of the Balkan Peninsula

In reviewing The Plant-Life of the Balkan Peninsula, by W. B. Turrill, which has appeared as the first of a series of Oxford memoirs of plant geography, the editor of the Quarterly Journal of Forestry (London) has written as follows:

> The Balkan Peninsula contains more native species of plants than any other part of Europe of the same area. It lies at the junction of three continents and has drawn its floral, as well as its human, population from many sources. Also, it was less affected by the ice age than other parts of Europe, and it still preserves many of its Tertiary species; and as it has a very varied climate and high mountain ranges it can find space for many types of ecological formations.
>
> The climate is of especial interest. The southern part of the peninsula is governed by Mediterranean conditions and has such a dry summer that at some meteorological stations the rainfall from June to September is considerably less than 1 inch. This drought is accompanied by high temperatures, and summer, rather than winter, is the rest period of the vegetation. The more northern and eastern parts have a Central European climate, with more or less evenly distributed rainfall and a very cold winter.

Nearly the whole of the peninsula was at one time covered by forest, but in the course of centuries the greater part of this has been destroyed by fire, grazing, lumbering, and cultivation. The climate is so near the limit for forest growth that regeneration does not occur freely, and the removal of litter and extensive goat grazing have left the forest no chance of holding its own. This has resulted in loss of soil, and much land that was once forested is now covered by very xerophytic shrub growth or is reduced to rock with plants only in the crevices. The Mediterranean flora, including some of the most cherished shrubs of our gardens, has advanced very considerably since the "dawn of civilization."

The forests that are left show an interesting zoning with regard to altitude. Under the Mediterranean climate *Pinus halepensis* and *P. pinea* are dominant up to 1,000 feet, where they give place to evergreen, or leathery-leaved, oaks. At 2,000 feet deciduous oaks occur, together with ash, sweet chestnut, etc., and above these is a second coniferous zone, generally dominated by *Abies cephalonica.* Under the Central European climate deciduous trees form the forest up to 5,000 feet, with many species of deciduous oaks in the lower levels and ash and beech higher up. This is succeeded above about 5,000 feet by a coniferous zone, including *Picea omorika* (a Tertiary relict), *Pinus silvestris, Picea excelsa,* and *Abies pectinata. Pinus peuce* also occurs in this region.

Forest Conservation in Sao Paulo, Brazil

(Based on text of regulations in Diario Official do Estado de Sao Paulo October 3, 1928)

Regulations promulgated in 1928 outlining the organization and functions of the State Forest Service of Sao Paulo contain among other provisions the following:

The owner of 100 hectares or more of land must keep at least 10 per cent of it in forest. He may clear-cut the whole area, but if 10 per cent of the area does not immediately restock by natural reproduction he must plant that much of it. The owner of 100 hectares or more of bare land is required to reforest 10 per cent of it within 5 years unless he is granted an extension by the secretary of agriculture. Before clearing land an owner must give 30 days' notice to the district office of the forest service.

Each of the five district offices is to maintain a nursery, from which a limited number of plants will be furnished to landowners free or at cost. Each district is also to establish a forestry museum showing the forest possibilities of the district by means of maps and charts and of exhibits of woods and articles made from them, forestry methods and tools, etc. The central office at Sao Paulo is to maintain a more elaborate museum for the entire State.

The forest service is to carry on propaganda work in favor of forest fire prevention and is to enforce the fire laws. These provide that before setting fire on cut-over or other land a landowner must clear a fire line 6 meters wide around it and warn his neighbors of intention to burn. He must also have an effect control force on duty while the fire is burning. Bru burning is permitted only during June, July, Augu and September. The sale and use of fire balloons prohibited.

One of the important forest protective duties of forest service is the extermination of ant hills. Brazil ants are among the worst enemies of forest Each forest district is required to maintain a corps skilled ant "matadores" whose duty it is to destr ant hills on public and private lands. Every owner obliged to destroy any ant hills on his land th threaten damage to the property of others, and if fails to do so the forest service will do it, charging h the cost plus 20 per cent. The forest service is furnish ant-killing tools and chemicals either free at cost.

Forest Law of Guatemala

The forest law adopted by Guatemala in 1925 p vides for Government control (regimen forestal) o all forest land belonging to the nation, to municipaliti and to corporations or individuals who request su control. Privately owned forest protecting the sour of streams or water supplies is under public regulati The law forbids the clearing of either public or priva forests within 100 meters of a ridge crest, or on slop where clearing will endanger life or property belo Commercial timberlands belonging to the State a declared reserves, and can be alienated only by spec act of the legislature. Even when they are th alienated, 10 per cent of the area must be kept forest. All municipalities are required to set as a portion of their land as forest reserves; if they ha no land in forest they must reserve bare land afforest it.

The department of agriculture is to make maps a working plans for all forest lands under public contr and has charge of concessions for cutting timber extracting other products. Cutting concessions mu provide for planting three young trees of specifi species for each one cut. (In the coffee and pine bel over 3,000 feet altitude, five trees must be planted not of the same species as the one cut). Planting mu be done at the beginning of the rainy season in t same year as the cutting, and in case of failure must repeated. The time of cutting is to be fixed by t department, and no immature trees may be cut, n may trees be felled in order to extract gum or res Concessions are to be granted only after public biddi following 3 months' advertisement, and run for 3 ye unless costly machinery is required, in which case years is the limit. Renewals for like terms are p mitted as long as the concessionaire is willing to pay much as any other bidder. The size of concessions limited on the basis of area or number of trees.

ıe department is directed, after suitable studies, to ertake the reforestation of bare land where forest ruction threatens the stability of the soil or the of streams. Nurseries and demonstration planta- are to be established in each forest region. Bare reforested by private owners is exempt from taxes ve years, and owners are to be exempt from certain ations as to military service in proportion to the ber of trees planted.

e last Sunday in May is designated as Arbor Day, observed by municipalities and all schools.

ivate owners may burn over their own land only taking due precautions and warning the local de and their neighbors 24 hours in advance. ing on windy days is forbidden. On State forests, ing is prohibited except where it may for various ns be deemed necessary, and then it is allowed only a fire line 20 meters wide has been cut and every snag and bush within 100 meters has been cut. Two peons equipped with axes, shovels, etc., must be kept on guard for every 100 meters of line, and four where the slopes are steep.

◆

Exceptionally cold weather experienced during the past winter in Belgium resulted quite commonly in the killing of planted Douglas fir. Heavy damage occurred in plantations established with seed obtained in the Pacific coast region of the United States, especially in those from seed originating in the Northwest; plantations believed to have been established with seed from the Rocky Mountain region survived. Plantations of Sequoia sempervirens suffered, showing much less frost resistance than plantations of S. washingtoniana.

◆

Forty-five township forests aggregating 411,765 acres have been established in Quebec under the control of the provincial forest service.

Personals

arold S. Newins, professor of wood utilization in the sylvania State College, has accepted appointment ie newly created position of chief forester of West inia. Following his graduation from the Yale st School in 1911, Mr. Newins worked on a national t, in a lumber mill, and as a demonstrator of kiln operation. He inspected aircraft woods for Government during the war, taught forestry in the on Agricultural College, and was eastern manager e dry-kiln department of the Cutler Desk Co. for years before joining the faculty of the Pennsyl- college in 1924.

. G. Wahlenberg has resigned from the United es Forest Service, after many years' work in forest rch at the Northern Rocky Mountain Forest riment Station and the Southern Forest Experi- Station, to accept a position with the Eddy Tree ding Station, Placerville, Calif. Mr. Wahlenberg specialized extensively in nursery practice.

cholas T. Mirov has accepted appointment as tant silviculturist, Southern Forest Experiment on. He will be assigned to naval stores work at ke, Fla. Mr. Mirov is a graduate of the Russian erial Forest School and has had wide experience ussia, in China, and in California.

M. Callward has resigned as extension forester of nont to accept a forestry position with St. Law- e University. His new work will include both ning and extension activities.

Roy L. Hogue has resigned as State forester of Mississippi, his resignation taking effect June 1.

Frank E. Bonner, for the past six and one-half years district engineer of the California National Forest District, has accepted appointment as executive secretary of the Federal Power Commission, succeeding O. C. Merrill. Mr. Bonner's membership in the United States Forest Service dates from 1909. His first assignment was in the Northern National Forest District, with headquarters at Missoula, Mont. For a number of years he was assistant engineer in the Washington, D. C., office of the service, and for a short period he was stationed at the Forest Products Laboratory. He is succeeded by E. W. Kramer, hydroelectric engineer of the California National Forest District.

William K. Williams, jr., has accepted appointment to the position of extension forester in the Office of Cooperative Extension Work, United States Department of Agriculture. For more than two years Mr. Williams has been extension forester for Arkansas. Prior to that service he was for four years forester for the Crossett Lumber Co., Crossett, Ark. He is a graduate of the Yale Forest School, and as a result of winning an honor scholarship had a year of forestry study in Sweden.

James B. Ellis, Dallas County, Ala., has been elected to membership on the Alabama Commission of Forestry, filling the vacancy caused by the death of J. Lee Long.

Fred Cronemiller has been promoted to the supervisorship of the Modoc National Forest, Calif., left vacant by the death of George W. Lyons. Mr. Cronemiller leaves the position of associate range examiner in the California National Forest District.

Members recently appointed to the Appalachian Forest Research Advisory Council for a 3-year term are J. P. Hummel, Hummel-Ross Fiber Corporation, Hopewell, Va.; George Curtin, Pardee & Curtin Lumber Co., Clarkesburg, W. Va.; and H. L. Tilghman, Tilghman Lumber Co., Marion, S. C.

Reuben W. Smith, who for the past year has been connected with the National Lumber Manufacturers Association, has accepted a position as field engineer with the California Redwood Association.

Arthur T. Upson has been promoted by the National Lumber Manufacturers Association from the position of eastern divisional manager to that of assistant trade extension manager. In his new position he will direct the association's division of lumber standards and specifications and will be charged with the promotion of its grade-marking and trade-marking program. Mr. Upson's connection with the Lumber Manufacturers Association, which dates from 1924, was preceded by 10 years' experience as a national forest officer and 4 as an executive of the Forest Products Laboratory.

S. V. Fullaway, jr., who left the United States Forest Service in 1927 to take charge of the Portland, Oreg., office of the National Lumber Manufacturers Association, has accepted the secretary-managership of the Western Pine Manufacturers Association, left vacant by the resignation of A. W. Cooper.

B. E. White has been appointed to a position with the Extension Service of Oklahoma that includes half-time duty as extension forester. Mr. White received the B. S. degree in botany from the University of Arkansas and has had experience as a county agent. He will be stationed at Stillwater, Okla.

W. E. Bond has taken charge of the division of forest protection of the Texas Forest Service, recently left vacant by the resignation of H. J. Eberly. C. B. Webster has succeeded Mr. Bond as chief of the division of forest management in the same organization, and Mr. Webster's former post as Texas farm forester has been accepted by C. W. Simmons. Mr. Simmons comes to the extension position from the United States Forest Service, after several years' experience on the national forests of Arizona and New Mexico.

Earl T. Barron has been assigned to the staff of the State forester of California as inspector at large to assist in the supervision of the State fire control organization. Mr. Barron has been a member of the California forestry organization for several years. He leaves the position of regional inspector in the Mother Lode district.

Edward N. Munns, Chief of the Office of Forest Experiment Stations, Joseph Kittredge, jr., silviculturist of the Lake States Forest Experiment Station and A. J. Stamm, chemist of the Forest Products Laboratory, have been designated to represent the United States Forest Service at the seventh congress of the International Union of Forest Experiment Stations in Stockholm, Sweden, July 22–27. After the meeting the Forest Service representatives will make a study of forest research in Sweden and in seve[illegible] other European countries.

P. R. Gast, of the Harvard Forest and the Northeastern Forest Experiment Station, has been appointed to a National Research fellowship and is sailing in July for Sweden, where he expects to study for a year under Heinrich Hesselman, director of the Swedish Forest Experiment Station at Stockholm. Doctor Gast will specialize in forest soils, with particular reference to nitrogen relations.

A. B. Hatch, junior forester at the Allegheny Forest Experiment Station, has been awarded a Scandinavian-American fellowship for 1929–30. He will study at the Swedish School of Forestry, Stockholm, under Doctor Melin, his particular study being the rôle of mycorrhiza in relation to tree growth.

John T. Auten, who has for several years been teaching forest soil science and chemistry at the Pennsylvania State Forest School, is joining the staff of the Central States Forest Experiment Station. As a member of the United States Forest Service, Doctor Auten will continue his studies of forest soils.

H. L. Shirley has been appointed associate silviculturist at the Lake States Forest Experiment Station, effective August 1. Doctor Shirley received the doctor's degree from the Yale Forest School, at whic[illegible] specialized in the relationship of light to the growth of forest species. For the past year he has been associated with the Boyce Thompson Institute for Plant Research.

J. Frank Sharpe has been appointed forester in charge of provincial forests of Ontario, under the act providing for the establishment of eight provincial forests in different parts of the Province with a total area of about 25,000 square miles. Mr. Sharpe has been connected with the Ontario Department of Lands and Forests ever since his graduation from the University of Toronto seven years ago, having charge of the estimates and surveys branch during the greater part of that period.

Ray C. Steele, game protector of the Bureau of Biological Survey, with headquarters at Portland, Oreg., has been designated to succeed William T. Cox, head of the new forest service of Brazil, as superintendent of the Upper Mississippi River Wild Life and Fish Refuge.

K. J. Seigworth has been appointed district forester the Eastern Shore of Maryland to succeed A. A. ppel, now with the United States Chamber of Com- rce. Mr. Seigworth is a forestry graduate of the nnsylvania State College and has had two years' perience in private employ in the South.

William Maughan, one of this year's graduates of the le Forest School, has been appointed assistant in plied forestry in the school for the year 1929–30. fore entering Yale Mr. Maughan was an instructor forest engineering at the New York State College of restry.

H. H. Chapman, professor of forest management in Yale Forest School, has been appointed president the Connecticut Commission on Forests and Wild e, to succeed Hon. Frederick C. Walcott, newly cted United States Senator.

C. Cyril Klein, recently nursery superintendent with the Maryland Department of Forestry, is now city forester and superintendent of parks for the city of Frederick, Md. In this position he has charge of 7,000 acres of forest owned by the city, as well as of the city park system and street trees. Concurrently, he is to hold the position of assistant district forester in charge of the Catoctin-South Mountain section, supervising the fire-control work throughout that territory.

Hugo L. Sundling, who earned a master's degree in forestry at Pennsylvania State College during the past school year while on leave of absence from the Allegheny Forest Experiment Station, is returning to Federal forestry work as a member of the staff of the California Forest Experiment Station. He will work with W. C. Lowdermilk on studies of erosion and run-off.

Bibliography

erman Journal of Forestry Abstracts

A quarterly journal of forestry abstracts is being blished by the J. Neumann Press, of Berlin, under title Forstliche Rundschau, the first number having peared in October, 1928. This is a continuation of rstliche Jahresberichte, published for 40 years at ankfurt and Tübingen. The journal is international scope. Its purpose is to give at all times an accurate umé of forestry progress and achievement. Profes- Weber, of Freiburg, is editor in chief, with collabora- s in various countries. The American collaborator rof. A. B. Recknagel, New York State College of restry. Inquiries in regard to the journal may be dressed to Professor Recknagel, or to J. Neumann, haltstrasse 7, Berlin SW 11.

New Canadian Woodlands Monthly

The woodlands section of the Pulp and Paper Mag- ne of Canada, heretofore published as a monthly pplement of 16 pages, has expanded into a monthly gazine of 36 pages entitled "Canadian Woodlands view." In its first number, which appeared as that May, 1929, the new magazine stated that it "is not the general public nor for the man with rod and gun, t is for the forest engineer, the woods manager, and who are interested in our Canadian tree-growing as from a financial, industrial, and professional pect." J. N. Stephenson, the editor, announces at Norman MacKinnon, a forestry graduate of erdeen University experienced in Canadian woods erations and forestry work, has joined the publisher's torial staff and will devote his efforts principally to the Woodlands Review. The publisher is National Business Publications (Ltd.), the Garden City Press, Toronto, Ontario, and Gardenvale, Quebec.

Maine to Publish Helpful Manual of Forest Insects

Henry B. Peirson, who becomes State entomologist of Maine on July 12 of this year, after serving the State for eight years as forest entomologist, has ready for the press a new pocket manual to be used by field men in reporting insect attacks on forest trees. All phases in the life histories of the forest insects that are important in the State are shown by a single page of illustrations, the pictures for each of the individual species forming a strip across the page. This gives the field man an easy way to get acquainted with the different forms and to associate these forms with each other. Instructions, simple and nontechnical but complete, are given for reporting an insect attack. An index enables the field man unacquainted with entomology to begin with the species of tree which he finds being attacked and look up the kinds of insects likely to be responsible. The manual contains in small compass an immense amount of practical information. It will be distributed to all field men in the State service, including the 600 fire wardens. The field men have orders to report to Doctor Peirson any insect outbreak they may observe, and are to be instructed in the detection of insect outbreaks by R. W. Nash, one of this year's graduates of the Massachusetts Agricultural College.

Any inquiry about this manual should be addressed to Dr. Henry B. Peirson, Statehouse, Augusta, Me.

Age Can Not Wither A Good Book

By WALTER P. TAYLOR, United States Bureau of Biological Survey

A book first published in 1864 that retains the utmost interest and significance today is George Perkins Marsh's The Earth as Modified by Human Action. The author of this work was born at Woodstock, Vt., in 1801. He was admitted to the bar in 1825, entered Congress in 1843, was appointed United States minister to Turkey in 1849, subsequently served as fish commissioner and then railway commissioner of Vermont, and from 1861 until his death in 1882 was United States minister to Italy. Known as a philologist and as "the patriarch of American diplomacy," he was also an outstanding patron of the sciences. He was both a friend and a powerful supporter of Spencer F. Baird, famous secretary of the Smithsonian Institution.

Together with personal observations of a long lifetime that included wide travels, there went into this book the results of voluminous reading. In the original 1864 edition, which appeared under the title Man and Nature, the 63-year-old author's list of the works consulted in the preparation of the volume included 210 titles, representing English, French, German, Italian, Dutch, Scandinavian, and Latin literature. When the book reappeared under its new title in 1874, this list of references had expanded to 363 titles. A third edition was copyrighted in 1884 and appeared in 1885.

An almost prophetic insight enabled Marsh to anticipate many of the conclusions to which we of a later day are being forced in regard to deforestation, erosion, and the results of man's disturbance of the biological balance of nature. It was his belief that "every plant, every animal, is a geographical agency, man generally a destructive; vegetables, and in some cases even wild beasts, restorative powers" (p. 55 [1]). He believed also that "all nature is linked together by invisible bonds, and every organic creature, however low, however feeble, however dependent, is necessary to the well-being of some other among the myriad forms of life * * *"(p. 137). Ecological research affords a good deal of support for this view, although there is a vast difference in the importance of the rôles played by the various species in a given community.

All of us who have to do with any phase of wild-life or plant-life management may well ponder the principle stated by Marsh as follows: "As often as we destroy the balance by deranging the original proportions between different orders of spontaneous life, the law of self-preservation requires us to restore the equilibrium, by either directly returning the weight abstracted from one scale or removing a corresponding quantity from the other. In other words, destruction must be either repaired by reproduction or compensat by new destruction in an opposite quarter" (p. 14 Failure to take full account of this principle has result on the one side in decrease or even extermination valuable wild species and in elimination of rich resour in forage and forest lands; on the other side, in und increase in weeds, insects, rodents, and game. Marsh "law" cuts both ways. It puts the emphasis where belongs, namely, on thinking through our manageme systems, so far as possible, to their ultimate co quences. In many instances much research is need before we can anticipate the results of our acts.

Marsh gave considerably more attention to anim relations than has been the custom of many lat writers on kindred subjects. One of the influences mentions with appreciation is the effect of earthworm and small burrowing quadrupeds on the permeabilit of the soil (e. g., pp. 25, 128-129). He refers to th rôle of beavers in producing bogs and those of small animals, insects, and birds in destroying the woo (pp. 27-31, 131–132), but without expressing an apprehension of considerable or permanent chang from these causes except, perhaps, in the case of insect At one point he states that "Young trees in the nati forest are sometimes girdled and killed by the small rodent quadrupeds, and their growth is checked b birds which feed on the terminal bud; but these animal as we shall see, are generally found on the skirts of th wood only, not in its deeper recesses, and hence th mischief they do is not extensive" (p. 31). In th light of the work of later naturalists this statemen doubtless requires modification, for it is ever clear that under the increasingly disturbed conditions of th present day animals may do serious mischief to fores trees.

It was Marsh's opinion that even when they most numerous the wild quadrupeds of North Ame were few compared with the "many millions o hoofed and horned cattle now fed by civilized man o the same continent." He strongly condemned th practice of grazing domestic animals in woodlands asserting (p. 371) that "no growth of young trees i possible where horned cattle, sheep or goats, or eve horses are permitted to pasture at any season of th year, though they are doubtless most destructive whe trees are in leaf."

In one place (p. 21, footnote) our author says "Th succession of crops, which occurs in all natural forests seems to be due rather to changes of condition than o climate." This seems to indicate a foreshadowing o later ideas of ecologic succession.

Marsh was deeply impressed with the effects o deforestation on erosion. He quotes Charles de Ribb (p. 243) to the effect that in the seventeenth century in Upper Provence and in Dauphiny, France, the augmented violence of torrents following the clearing o e forests swept away or buried in sand and gravel re land than had been reclaimed by clearing, re- ting in gradual abandonment of considerable tracts the starving inhabitants.

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[1] Page references are to the 1874 edition. The publisher is Charles Scribner's Sons, New York.

In his chapter on The Woods, Marsh has an interest- section on the destruction of forests in France at e time of the French Revolution (pp. 339-344): The general crusade against the forests, which accom- nied that important event, is to be ascribed, in a nsiderable degree, to political resentments. * * * e Tiers État declared, in 1789, 'the most terrible ourge of agriculture is the abundance of wild game, onsequence of the privileges of the chase; the fields e wasted, the forests ruined, and the vines gnawed wn to the roots.' * * * In the popular mind e forest was associated with all the abuses of feudal- n, and the evils the peasantry had suffered from the gislation which protected both it and the game it eltered, blinded them to the still greater physical schiefs which its destruction was to entail upon em."

Marsh's book is valuable not only for itself but also a key to many old French, Italian, German, and her works dealing with the same or related subjects

New Wisconsin Tree Manual

A pocket manual on Forest Trees of Wisconsin has en published by the conservation commission of that ate, the text having been prepared by Extension orester F. G. Wilson with the cooperation of W. R. Iattoon, United States Forest Service. An introduc- on in which Mr. Wilson discusses in popular style e growth and reproduction of trees is followed by lustrated descriptions of 57 tree species. The text cludes many interesting and helpful facts and sugges- s not only for timberland owners but for campers, unters, and others who go to the woods for recreation. he booklet is supplied by the Wisconsin Conservation ommission at a charge of 15 cents.

A Forestry Bulletin for Wisconsin Farmers

The Farm Timberlot, by F. G. Wilson, extension orester, Wisconsin College of Agriculture, presents in eadable form the more important phases of the grow- ng of timber as a farm crop in Wisconsin. Forestry s discussed as an integral and profitable part of farming aking it possible for otherwise unproductive portions f the farm unit to pay their way and for farm labor o be utilized at odd intervals. One of the important dvantages listed is that timber growing "produces crop which is not perishable but can be left to grow if esired." Soil, moisture, and light requirements of ifferent tree species, and the value of their wood for given uses, are discussed. Specific directions are given for cutting to improve sapling and polewood stands and for rejuvenating heavily-grazed old stands. Other subjects treated are the undesirability of combining grazing with timber growing in the Wisconsin farm woodland, and methods of cutting and logging timber for fuel and other farm use. Helpful points are presented on the selling of farm timber.

This well-illustrated bulletin of 32 pages is published by the Agricultural Experiment Station, University of Wisconsin, Madison, Wis., and is available on request.

Long-Bell Co. Publishes Planting Manual for Farmers

Southern farmers are receiving as a gift from the Long-Bell Lumber Co. an attractive illustrated booklet entitled "The Farmers' Manual of Woodland Planting." A foreword states that "the Long-Bell Lumber Co. has noted with deep satisfaction the interest shown by farmers in reforestation in the regions where its forestry activities are going forward. In numerous instances its foresters have been asked to furnish information about tree planting and even to plant areas of non-agricultural land for the owners of farms. In view of the evident fact that such interest is growing everywhere in the South, it has been thought advisable to prepare a manual of woodland planting for the especial use of southern farmers." The remarks on the advisability of timber growing as a farm enterprise, the discussion of forest tree species recommended for growing on farms, and the suggestions as to methods of establishing, caring for, and harvesting the farm woodland are written in a direct, concise manner that assures the usefulness of the booklet.

Bulletin Tells Boys What They Can Make from Boxes

The first volume in a series of publications on practical uses for second-hand boxes and odd pieces of lumber has been issued by the National Committee on Wood Utilization under the title "You Can Make It." The bulletin is intended especially for the use of boys, and was prepared with the cooperation of the Boy Scouts of America, the Y. M. C. A., Junior Achievement (Inc.), and several other such organizations. It contains directions, with diagrams, for making more than 100 articles grouped as amusement devices and as equipment for the camp, for the garden, and for the home. Copies can be obtained at the price of 10 cents each from the Superintendent of Documents, Government Printing Office, Washington, D. C.

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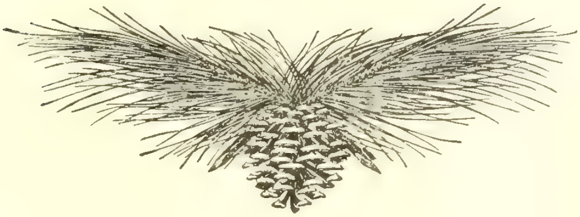
Contour map (prepared in cooperation with the Nation al Park Service), ½-inch, Glacier National Park with parts of the Blackfeet, Flathead, and Lewi and Clark National Forests.

U. S. GOVERNMENT PRINTING OFFICE: 1929

FOREST WORKER



September, 1929

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Announcements

Second Georgia Forest Fair

The second annual State forest fair of Georgia will be held November 21–23 at Valdosta, Ga., under the general direction of the Georgia Forest Service with the Valdosta Chamber of Commerce assisting. Exhibitors will include Federal and State forestry organizations, forestry and lumber associations, and manufacturers of lumbering, fire fighting, and fire-break construction implements and machines. An educational program of moving pictures, lantern slides, and lectures will be carried out in the exhibit building, and it is planned to conduct demonstrations at near-by forests on methods of growing seedlings, planting, turpentining, thinning, constructing firebreaks, fighting forest fires, and burning railroad rights of way.

Pan American Agricultural Conference

The Pan American Union has announced that an inter-American conference on agriculture, forestry, and animal industry will be held in Washington, D. C., in 1930, opening on May 12.

First Florida Forestry Fair

The first Florida forestry fair will be held Lake City, Fla., November 13–15, under the direct of the Florida Forestry Department. Its purp will be to stimulate interest in forestry and dem strate the possibility of increasing forest product through protection. Exhibits will be shown by estry and lumber organizations, and forestry t and equipment will be displayed by manufactur Methods of fire-line construction will be demonstra A trip to various turpentine plants will be direc by Lenthall Wyman, associate silviculturist of Southern Forest Experiment Station.

Second Pan Pacific Food Conserva Conference

The Pan Pacific Union has issued tentative age for the Second Pan Pacific Food Conservation ference, to be held in Honolulu, August, 1931. of the subjects for discussion in the reclamation tion is forests as related to streamflow.

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State Forestry

Forest Fires in 1928

Forest fires occurring in the calendar year 1928 vered 43,931,310 acres of land in the United States,[1] cording to a summary of reports of State forestry ficials and of national forest officers. Reports of es on the 178,855,050 acres of land needing fire pro-ction for which such protection has not yet been ovided show that 39,502,810 acres of this land were rned over during the year, with damage estimated $74,350,600. Of the 389,498,960 acres of protected nd 4,428,500 acres were swept by fire, with damage timated at $8,583,620. Thus the year's fires covered out 1 acre in 5 of the land that was without pro-ction, and about 1 acre in 100 of the protected nd.

Reports of State officials and of national forest ficers for 1928 list a total of 177,362 forest fires. f the fires reported 40,579 occurred on protected nds and 136,783 on areas without protection.

In 1928, organized fire protection maintained in-ependently or cooperatively by the Federal Govern-nt, State governments, and private landowners was xtended over nearly 20,000,000 acres of land that had ot been protected in 1927. This made the total pro-ected acreage 389,498,960, or 68.5 per cent of the total n need of protection.

Smokers were responsible for the largest number of res on protected lands, causing 8,346 fires, or 20.6 er cent of the total. Incendiarism ranked next mong the causes to which fires were traced, being ound responsible for 7,276, or 17.9 per cent, of the ear's fires. Brush burning was reported to have aused 13.2 per cent of the fires, lightning 9.3 per cent, amp fires 9.1 per cent, railroads 8.9 per cent, lumber-ng 3.9 per cent. For 7.9 per cent the causes were nknown. Reports as to causes of fires on unpro-ected areas were not sufficiently complete or re-iable to warrant tabulation.

In 1928 as in 1927, more forest fires were reported in the Gulf States than in any other group. A total of 99,120 fires on unprotected land and 12,987 on protected land were reported in this group of States, which includes Alabama, Mississippi, Louisiana, Texas, Arkansas, and Oklahoma. As against 1.14 per cent for the United States, for this group of States the proportion of the protected forest area burned over during the year was 5.60 per cent. For the other groups of States the proportion of protected area burned over was as follows: Central States (Ohio, Indiana, Illinois, Kentucky, Tennessee, Missouri), 1.68 per cent; Pacific Coast States (Washington, Oregon, California), 1.64 per cent; Middle Atlantic States (New Jersey, Pennsylvania, Delaware, Maryland), 0.99 per cent; Southeastern States (Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida), 0.98 per cent; Lake States (Michigan, Wisconsin, Minnesota), 0.43 per cent; Northeastern States (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York), 0.21 per cent; and Rocky Mountain States (Montana, Idaho, Wyoming, South Dakota, Colorado, Arizona, New Mexico, Nevada, Utah), 0.12 per cent.

California Maintenance Crews Subject to Service on the Fire Line

A new agreement between California's departments of public works and natural resources gives 1,700 highway maintenance men the status of emergency forest fire fighters. Maintenance crews will at all times be subject to call by State rangers for combating fires on and adjacent to highway rights of way and when called to a fire will work under the command of the forest ranger or inspector in charge until relieved. When maintenance men discover fire near their work they will independently take charge of its suppression until members of the State fire patrol reach the scene. Salaries of maintenance men for time spent in fighting fire will be paid by the State forest service unless the fire has been caused by highway maintenance operations.

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[1] Figures given in this article are for private and State-wned forest land and national forests in continental United tates exclusive of Alaska. Those for unprotected areas are ecessarily rough approximations.

Clarke-McNary Tree Distribution in 1928

In the calendar year 1928, 28,757,448 forest trees were distributed to farmers by 34 States, Hawaii, and Porto Rico in cooperation with the Federal Government under provisions of the Clarke-McNary law. Timber production was the principal or sole purpose of most of the farm plantings thus provided for; the development of shelter belts and windbreaks was a minor purpose in 15 States and Porto Rico, the major purpose in Washington, Oregon, Nebraska, Colorado, and Oklahoma, and the sole purpose in Hawaii, California, Montana, Wyoming, North Dakota, and Kansas. The total number of trees distributed by the cooperating agencies, the species and ages predominating among the stock so distributed, and the approximate range of prices to the farmer per 1,000 trees, have been summarized from the agencies' reports as follows:

Maine: 123,470; northern white pine, white spruce, and Norway pine; 3-year transplants; $8.

New Hampshire: 536,794; northern white pine, Norway pine, and white spruce; 3-year and 4-year transplants; $5.95 to $7.50.

Vermont: 862,500; Norway pine, northern white pine, Norway spruce, and Scotch pine; 2–1 year transplants; $6.

Massachusetts: 1,139,700; northern white pine, Norway pine, Norway spruce, and white spruce; 3-year, 4-year, and 5-year transplants; $7.50 to $14.

Connecticut: 340,600; Norway pine, northern white pine, white spruce, and Norway spruce; 2-year and 3-year seedlings, 3-year and 4-year transplants; $4 to $10.

New York: 9,840,000; northern white pine, Norway pine, Norway spruce, Scotch pine, white spruce, European larch, black locust, balsam fir, northern white cedar, Carolina poplar; cuttings, 2-year seedlings, 3-year transplants; $1 to $5.

Pennsylvania: 9,062,396; northern white pine, Norway pine, Scotch pine, Norway spruce, Japanese larch, white ash, pitch pine, black walnut, white spruce, black locust, red oak; 1-year to 4-year seedlings, 2–2 year, 3–1 year, and 2–1–1 year transplants: $2 to $5.

New Jersey: 783,000; Norway pine, Norway spruce, Scotch pine; 2-year seedlings; $4 and $6.

Maryland: 144,500; Norway pine, loblolly pine, Norway spruce, Scotch pine; 1-year and 2-year seedlings, 2–3 year to 3–5 year transplants; $2.50 to $30.

Delaware: 66,600; loblolly pine, Norway spruce, Scotch pine; 2-year seedlings; free[1] to $2.50.

Virginia: 31,007; loblolly pine, black locust; 1-year and 2-year seedlings; $4 to $7.50.

North Carolina: 175,947; loblolly pine, longleaf pine; 1-year and 2-year seedlings, $3.

Georgia: 24,000; slash pine, loblolly pine; 1-year seedlings; $2.50 and $3.

Alabama: 48,600; longleaf pine, black walnut, talpa; 7-month and 8-month seedlings, free[1] $2.50.

Louisiana: 250,800; longleaf pine, black locust, sl pine, loblolly pine; 1-year seedlings; $1.50 (for a

Oklahoma: 18,800; Chinese elm, black walnut; 1-y and 2-year seedlings; free[1] (for experimental pla ing) to $10.

Ohio: 1,528,200; Norway pine, Scotch pine, Corsi pine, black locust, Austrian pine, black wal white ash, Norway spruce, red oak, northern w pine, western yellow pine, yellow poplar; 1- 2-year, and 3-year seedlings, 1–1 year, 2–1 year, 2–2 year transplants; $1.50 to $5.

Indiana: 361,900; Norway spruce, black locust, N way pine, northern white pine, black walnut, low poplar, Scotch pine, white oak; 1-year 3-year seedlings; $2.50 to $10.

Kentucky: 42,400; black locust, black walnut; month and 1-year seedlings; $5 and $10.

Tennessee: 91,800; black locust; 1-year seedlin $1.50.

Missouri: 2,200; osage-orange, northern white pi 1-year and 2-year seedlings; free[1] and $6.

Iowa: 52,800; black walnut, cottonwood, north white pine, black locust, ash; 1-year and 2-y seedlings, 2–4 year and 4–6 year transplants; of packing, shipping, and transportation.

Montana: 43,500; caragana, green ash, boxel western yellow pine; 1-year seedlings, 3-year tra plants: $5 and $6.

Idaho: 183,300; black locust, boxelder, western low pine; 1-year seedlings, 1–1 year transplar $2.50 to $8.

North Dakota: 47,000; boxelder, caragana, green Chinese elm; 1-year and 2-year seedlings; fr (all).

Nebraska: 682,000; Scotch pine, Austrian pine, An ican elm, caragana, honeylocust, mulberry, gr ash, catalpa; 1-year seedlings, 1–1 year and year transplants; $10 (all).

Kansas: 17,750; osage-orange, tamarix (and 14 species); cuttings, 1-year and 2-year seedlin year and 3-year transplants; $16 to $40.

Wyoming: 47,685; western yellow pine, cottonw "diamond willow"; 2-year seedlings, 2–1 transplants; $12 to $50.

Colorado: 154,300; western yellow pine, honeyloc American elm, Russian olive, blue spruce; 1- and 2-year seedlings, 2–1 year and 3–1 year tr plants; $10 to $40.

California: 28,250; shortleaf pine, redwood; 1- and 2-year seedlings; $5.

Hawaii: 197,600; cypress, Eucalyptus, melaleuca (and 40 other species); ½–1 year transplants; $ to $25.

Washington: 9,500; black locust (and 18 other cies); 1-year and 2-year seedlings, 2-year to 8- transplants; $2.50 upward.

Oregon: 88,700; black locust, western yellow green ash, Port Orford cedar; 1-year seedlings, year transplants; $2.50 (all).

Michigan: 660,649; Norway spruce, white spruce, pine, Norway pine, European larch, Japanese la northern white pine; 2-year to 7-year seedling year transplants; free to $10.

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[1] Free distribution usually implies payment by the recipient of cost of packing, shipping, and transportation.

[1] Free distribution usually implies payment by the r ent of cost of packing, shipping, and transportation.

sconsin: 627,700; Norway pine, northern white ine, Norway spruce, Scotch pine; 2-year and 3-year eedlings, 2–2 year transplants; $2.50 to $5.

to Rico: 441,500; Spanish cedar, saman, casu- rina, capa prieta, capa blanca (and more than 25 ther species); 3-month to 12-month seedlings; wo other States—West Virginia and Florida— ree[1] (all).

e operating forest nurseries under agreements with Federal Government in 1928, but their nurseries not been in operation long enough to produce ting stock for distribution to farmers in that year.

n addition to their distribution of trees to farmers, the calendar year 1928 the cooperating agencies tributed 18.330.141 trees for planting on private ds other than farms and provided 21,477,702 trees planting on State lands. Thus the cooperators tributed in all 68,565,291 trees. This figure does cover all planting stock distributed in that year m State forest nurseries; in a few cases forest nting stock was produced by State agencies not ing cooperative agreements with the Federal Gov- ment.

illions of State-Raised Trees Go Into Thousands of New York Plantations

orest planting projects were begun or continued 111 New York municipalities this spring, Conserva- n Commissioner Macdonald reports. Otsego, Erie, l Essex Counties planted 435,000, 400,000, and .500 trees, respectively. Sixteen railroads and er industrial concerns shared in the distribution State-raised planting stock, the Northern New rk Utilities (Inc.) alone calling for 1.250,000 trees add to the large number produced in its own eries. Plantings of from 1.000 to 152.000 trees e made by 31 fish and game clubs; the latter num- r is reported for the Broome County Sportsmen's sociation, which has been cooperating with schools roughout Broome County and starting demonstra- n forests on land belonging to the schools. Other ganizations that joined in the season's planting of ate-raised stock included 8 chapters of the Izaak alton League, 16 golf and country clubs, and 6 tary, Kiwanis, and Lions clubs. Further growth interest in school forest planting was shown, the ate nurseries receiving orders from 40 schools, high hools, and colleges and from 14 school districts.

The season's distribution of State-raised planting ck, which contributed to 3.231 separate reforesting ojects, is classified by the commissioner as follows:

	Number of trees
te land	4, 990, 550
nicipalities	3, 245, 950
lustrial concerns	2, 009, 450
hools and colleges	290, 820
y Scouts	80, 250
scellaneous organizations	1, 246, 460
lividual landowners	8, 617, 800

Hawaii Plants More Trees and Reserves More Land for Forestry

Planting operations on the Hawaiian forest reserves in the past two calendar years required 418,531 trees, or twice the number planted in the preceding biennium. In all cases "ball planting," as opposed to bare-root planting, was practiced. Plantings by this method are practically 100 per cent successful, Superintendent of Forestry Charles S. Judd reports.

Recent increases in Hawaiian forest reserve areas have brought the total to 980,682 acres.

Pennsylvania Department of Welfare Operates Tree Nursery

Since 1924 the prison labor division of the Pennsylvania Department of Welfare has operated a forest nursery in Centre County, midway between Bellefonte and State College. This nursery, known as the Rockview Forest Tree Nursery, now covers 18 acres and contains more that 12.000.000 trees. All the labor, from the sowing of the seed to the lifting and packing of trees for shipment, is performed by inmates of the new Western Penitentiary. Men are assigned to the nursery regularly and are thus given the opportunity to gain a thorough knowledge of nursery work. Wages are paid to them according to their proficiency. All phases of nursery practice are taught, including seed collection, pruning, and grafting.

From 500,000 to 1,000,000 seedlings are transplanted annually. During the past spring 3.6 miles of nursery beds were prepared and seeded, and 970,000 seedlings and transplants were supplied to the forestry organizations of seven States and the United States Forest Service. Twenty-five species of forest trees are carried in stock. Twelve varieties of pines are available for the coming planting season.

Further information about this nursery can be obtained from the prison labor division, Pennsylvania Department of Welfare, Harrisburg, Pa.

❧

Pennsylvania's auxiliary forest reserves total more than 41,125 acres, since the Clearfield Bituminous Coal Corporation recently added to its auxiliary forest reserve holdings 3,535 acres of land in Indiana and Cambria Counties.

❧

Vermont can now boast 40 municipal forests. Grafton and Bennington began reforestation projects this year. Plantings made this spring on 11 of the forests totaled 168,550 trees.

California Forestry Division Uses Fire Trucks of Special Design

Four specially designed fire trucks constructed in the shops of the State division of highways were placed in service this year by the California Division of Forestry. The apparatus is built on a 2-ton truck chassis with compound transmission governed at a speed of 40 miles an hour. Each truck has a water tank holding 225 gallons and ten 5-gallon pumps of knapsack type. Each is equipped with a high-pressure fire pump driven by direct connection to the engine crankshaft through a clutch at the front end. The tank can be filled from a well or stream either by an intake suction pump or by gravity, or from a city fire hydrant. Each truck carries 2,200 feet of hose of different sizes, a searchlight, a heavy cross-cut saw, a sledge, falling wedges, crowbars, other hand tools, and mess equipment for 50 men. Each carries seven men conveniently, and can carry more.

The four trucks were stationed at Riverside, Ukiah, Auburn, and Bakersfield.

◆

The North Carolina Department of the American Legion, in a resolution adopted at its annual convention at Raleigh, August 27, "indorses and recommends a program of reforestation, conservation, and restoration of wild life in North Carolina and commends to each individual post in this department that its members interest themselves in some phase of this work for the benefit of their own community and the State at large, sponsoring post activities in conservation and restoration and cooperation with all worthy agencies now striving for the same end," and "indorses the policy of establishment of an adequate system of State parks, forests, and game refuges."

◆

New Hampshire law for the control of the white-pine blister rust now provides that when in the opinion of the State forester and the commissioner of agriculture an emergency exists making it necessary to destroy the Ribes in any town the governor and council may order the town to carry out under the State forester's direction whatever control measures he specifies. If such an order is not complied with the State forester or his agents may remove or destroy the Ribes at the town's expense. The maximum expenditure that any town may be required to make under this act in any one year is set at $400.

◆

Purchase of more than 250,000 acres of land for State forest purposes has been authorized by the Pennsylvania State Forest Commission since June 1, 1929.

Michigan Law Clears the Way for Fir Line Extension

Michigan's forest fire law as amended this ye authorizes fire wardens to enter upon any unimprov lands in order to construct and maintain permane fire lines. It also authorizes the State director conservation to enter into contracts with railr companies, landowners, counties, and townships the cooperative construction and maintenance of p manent fire lines. The duration of such contracts limited to 10 years, and the department's financial ligation under them is limited to 50 per cent of t total cost of constructing and maintaining the f lines.

Michigan Establishes Woods Laborato for Study of Fire

A forested area of several thousand acres belong to the State of Michigan has been set aside for t study of forest fire problems. The land is loca within a few miles of Roscommon, in the sandy ja pine belt. In the studies to be conducted on it Michigan Department of Conservation will have cooperation of the Lake States Forest Experim Station and the district forester of the Lake Sta National Forest District. The area is to be s rounded with a 300-foot fire line and divided into l of from 20 to 40 acres. Fires will be set at differ seasons and different times of day and under differ weather conditions. Study will be directed princip toward determining how the incidence and spread fire and the damage caused by fires are influenc such factors as air temperature, air humidity, w velocity, and the inflammability of duff. When area has been burned over once or twice it will studied with respect to reforestation by natural artificial means. Fire damage to the second gro will be another subject of study. The experime fires will be used for testing pumps, tools, chemic backfiring, and other apparatus and methods, and the training of State fire rangers.

◆

A sixth forestry district has been organized North Carolina, with headquarters at Wilming W. C. Hammerle, formerly a ranger on the Chero National Forest, is in charge of forest fire con activities in the seven counties comprised in the trict, as district forester.

◆

Four hundred acres of land on Gogebic Lake, ond largest inland lake in Michigan, has been give the State and is being developed as the Gogebic L State Park.

ree Production at the Amherst Nursery

The Amherst Nursery of the Massachusetts De-rtment of Conservation, John and Charles Palmer charge, produces about 4,000,000 seedlings ready r transplanting every year. About 3,500,000 of these e sent to other State nurseries for transplanting d the remainder are transplanted in the Amherst rsery itself. About 500,000 transplants are turned t by the nursery annually. At the present time ere are about 12,000,000 trees in the nursery. orthern white pine and Norway pine are the prin-pal species.

This nursery uses a particularly successful method transplanting. The transplant board used holds trees. One man kneels with a bucket of trees, fills e board, packs the earth, and backs up to the next w. He doesn't move while planting a row. By is method a man has transplanted about 11,000 ees in an 8-hour day. The average is about 7,000 ees a day.

Three-ply tar paper has been used in the nursery r mulching white spruce for a number of years. his paper costs more to buy, but it lasts for years, an be used over and over again, and gives better esults than the thinner paper ordinarily used for the urpose.

onnecticut Increases State Park Appropriations

Appropriations totaling $610,144 have been made o the Connecticut Park and Forest Commission for naintenance and development of State parks in the year period beginning July 1, 1929, which is $400,-0 more than the amount so appropriated two years go. Appropriations for additions to State parks amount to $175,000, the second largest sum ever granted to the commission for this purpose. Appropriations for State forestry work in the new biennium total $345,000, or $70,000 more than those made in 1927. The amount allotted for acquisition of land for State forests, however, remains at its former level of $127,000 (of which $27,000 is for executive expenses).

For the care of trees, shrubs, and other vegetation along State roads in the biennium the State highway department has received an appropriation of $565,000.

* * *

Earl Keene, a farmer near Golden Hill, Dorchester County, Md., is reported by the Maryland Department of Forestry to have cut 62 cords of wood in 1928 from an area of less than 2 acres which he is positive was under cultivation in 1898. Since 1898 several cords of wood had been removed in thinnings.

Mississippi Lumber Company Adopts Reforestation Plan

The Gloster Lumber Co., Gloster, Miss., has set itself to the task of insuring perpetual operation of its sawmill by growing timber, the Mississippi Forest Service reports. F. A. Anderson, manager of the company, has been convinced of the possibility of profit from timber growing through his own observations on the growth of shortleaf pine. Not only is a reforestation plan being applied to the company's holdings of 100,000 acres in Amite, Wilkinson, and Adams Counties, but associate companies are being organized to purchase additional land for reforestation. One of these, the Southern Forest Products Co., has purchased 21,000 acres of land for this purpose. Riders have been employed to patrol the land, and many families are being given the use of small farms rent free on condition that they watch for fires. Fox hunters also have been enlisted as volunteer fire guards, and in order to stimulate their interest the company has bought and released on the land a large number of foxes.

On its swamp holdings in Adams County the Gloster Lumber Co. is planting locusts and black walnuts.

* * *

New Jersey State forest sales and leases in the year ending June 30, 1929, brought in $8,000, the State department of conservation and development reports. During the year 12 acres of southern white cedar on the Lebanon State Forest was thinned, this work concluding a cedar-thinning experiment that covered 26 acres of the forest and yielded products worth $8,750. On individual acres of dense young growth, the commission reports, the value of the thinnings reached $500.

* * *

Furniture manufacture ranks third among North Carolina industries, the State's department of conservation and development reports, being excelled only by the textiles and tobacco manufacturing industries in capital invested, number of wage earners, wages and salaries paid, value of product, and value added by manufacture. The origin of the industry in North Carolina took place about 1888, and was due to the presence of great hardwood resources.

* * *

The expenditure of $161,050 on 26 Illinois State parks was made possible through the release of funds in August by the State administrative board, according to an announcement by Superintendent of Parks P. J. Hoffmaster. It is planned to spend $20,000 of this amount on Hartwick Pines State Park,

Education and Extension

Pennsylvania Forestry Course Begins With a Year in the Woods

Students entering upon the 4-year course offered by the Pennsylvania State Forest School, in which the State forest school at Mont Alto and the forestry department of the Pennsylvania State College were recently merged, will spend the whole of their freshman year, including a summer session, at Mont Alto. The Mont Alto plant is situated at the edge of the 23,000-acre Mont Alto State Forest. In outlining the work of the freshman year the faculty announcement states that—

> At the same time students are pursuing courses in botany, mathematics, mechanical drawing, compass surveying, mensuration, and silviculture, they will engage in all the activities of administering a large State forest, including timber estimating, seed collection and storage, nursery practice, fire line, road, and trail construction and maintenance, cleaning and thinning of growing stands of timber, portable sawmill operation, and similar projects. In addition, each student will learn to identify the trees and flowering plants of the region, and become acquainted with the animal and bird life of the forest.

The sophomore year, spent at State College, will be devoted to the study of fundamental sciences, English, surveying, soil science, forest ecology, and mensuration. The work of the summer following the sophomore year will include training in topographic surveying under the department of civil engineering, study of logging and milling operations and wood-using industries, practice in timber estimating and mapping, and silvicultural studies.

At the beginning of the junior year students will be permitted to choose among four courses which have been given the names "professional forestry," "lumber industry," "wood utilization," and "private forestry." Further opportunity for specialization will be given to students in high standing who have shown a natural aptitude for some special phase of forestry. The senior year will conclude with two months spent at Mont Alto, during which each student will prepare a written working plan for a large tract of timber.

A 2-year ranger course, conducted at Mont Alto, is offered to students who have had at least two years of high-school training or the equivalent. A summer course is included. In April of the second year, students will be assigned for practical training on national or State forests or with nursery companies, lumber companies, wood-using industries, or private forestry concerns, according to their fitness and i clination.

This year the school has enrolled 78 freshmen in t 4-year course, the largest number it can accommodat and about 20 first-year men in the ranger course.

Yale-Firestone Forest Survey of Liberi

By Samuel J. Record, Yale School of Forestry

G. Proctor Cooper, field assistant in tropical fo estry at Yale University, returned to New Haven i August after nearly a year's investigation of the fo ests of Liberia, West Africa. This work was done b the Yale School of Forestry in cooperation with th Firestone Plantations Co., which is establishing e tensive rubber plantations in Liberia. The clearin of large tracts of virgin timber afforded an unprec dented opportunity for study of forest conditions i West Africa. Since conditions in the Liberian forest are in many ways typical of those for hundreds miles eastward the results of this study will apply t a vast region of tropical forests just now on the ev of exploitation for many kinds of timber other tha mahogany.

Numerous sample areas were carefully laid out an all the trees on these areas were listed and measure Hundreds of wood specimens were obtained, togethe with leaves, flowers, and fruits of the trees for bot ical identification. Logs of 130 different species we hewed out and will be tested for strength and othe properties in the Yale Forest School laborator These logs represent every degree of hardness an color from the white and punky "corkwood" to th flinty "red iron-bark." Boards of native manufactur will be tried out for their carpentry and furnitur value.

Since so little is known in America about the flor of West Africa, I personally arranged last summer t have the trees and other plants identified at the Roya Botanic Gardens, Kew, England. Three sets of her barium samples have been shipped to England—on for Kew, one for the Natural History Museum in Lo don, and one for the Imperial Institute at Oxfor The returns already received indicate that the co lections are of high scientific value. Trees are alway much more difficult to obtain than the lower form of vegetation, and are accordingly poorly represente in herbaria. When the final determinations are made a number of duplicate sets will be distributed t important institutions in this country.

With the assistance of Rupert H. Drinkwater, of ndia, Mr. Cooper collected a series of birds from he tropical evergreen forest for Peabody Museum, t Yale. Since the natives call many of the birds y the same names as the trees in which the birds ve or on the fruit and seeds of which they feed, lentification of the "bird in the bush" is often a reat help in identifying a tree. A collection of the orest insects, mostly butterflies and beetles, is now t Peabody Museum awaiting study and classificaion. Dried barks, leaves, and fruits from 75 of he trees that occupy an important place in native nedicine and witchcraft are to be studied and anayzed by pharmaceutical chemists. Some of these lants contain very powerful and even deadly alkaoids which the natives use as poisons.

In connection with the "devil worship" which hey cultivate the natives of Liberia entertain great eneration for certain trees, particularly for the "sass wood," or "king tree," and the "ge-ahn-de-pay." The ark of each of these trees contains a powerful alkaoid that is used with deadly effect in the "palaers" for testing persons accused of serious crimes. Very many of the trees and plants in the jungle have pecial uses in the life of the natives. One kind of ree leaves may be used as a vermifuge, another for lysentery, another as a poultice on a child's head to nake the skull tough. A bark may contain a poison for killing fish or for poisoning arrows, or it may be considered a cure for leprosy or elephantiasis or even malaria and yellow fever. The juice from a leaf nay be considered valuable as a remedy for conjunctivitis or as a dressing for cuts and ulcers, and the seeds or fruits of any given tree may in some parts of the country be held to aid in relieving the pains of hildbirth or to stimulate the flow of milk. Though some of the concoctions of the witch doctors and "Zoe" women of the villages and clans are of very loubtful value, others have a definite therapeutic principle.

All the material brought back by Mr. Cooper was collected many miles inland. In moving it to the coast he made use successively of native porters, launches, and auto trucks.

The Liberian wood specimens bring the total in the Yale collections to 16,000, representing 1,650 genera of 170 natural families. This is by far the most extensive assortment of woods in the world. It represents nearly every country of the earth. More than 2,000 samples, many very rare, have been added since the first of this year from the West Indies, Mexico, Central and South America, Japan, Siam, Java, New Caledonia, Papua, New Guinea, Norfolk Island, Australia, and all parts of Africa. Yale is cooperating with Oxford in an expedition to East Africa, and with the Field Museum in an exploration of the forests of the Peruvian Amazon. The specimens are being systematically studied by scientists and students at Yale, and selected lots are being sent to foreign institutions for special investigation.

Hawaii and Porto Rico Employ Extension Foresters

During the summer just past Hawaii and Porto Rico both acquired their first extension foresters. Theodore C. Zschokke, a graduate of the Yale School of Forestry who has had 13 years' forestry experience in the Philippines and 4 as assistant superintendent of forestry in Hawaii, is appointed to the Pacific post; the Porto Rico appointee is Charles Z. Bates, who was graduated from the Pennsylvania State Forest School and has served in Porto Rico for 9 years as planting specialist and assistant forester.

In Hawaii extension work will be directed toward the development of interest in reforestation and the promotion of forest planting for windbreaks, erosion control, and the production of fence posts and firewood. Demonstrations will be arranged through the county extension agents, planting stock being provided by the board of agriculture and forestry without charge to demonstrators whose requests are approved by the extension forester. In Porto Rico planting will form the main project on the farm forestry program, with emphasis on the replanting of the coffee cultural forests (69 per cent of which are reported to have been destroyed by the hurricane of September, 1928) and on the planting of windbreaks. For plantings to shade coffee plantations the extension service will distribute guama peludo (*Inga villosissima*) and guama negro (*Inga fastuosa*), species recently introduced from the coffee regions of Venezuela. These species, Mr. Bates writes, have no dangerous enemies in the form of insects or fungi and are superior in many respects to the guava (*Inga inga*) and guama (*Inga laurina*), hitherto generally used for this purpose in Porto Rico. It is expected that Government encouragement will have a marked influence in interesting the small coffee-forest owner in the advantages of a well-managed woodlot, of which he has hitherto shown little consciousness.

* * *

Eight hundred boys and girls of New Hampshire planted about 400,000 forest trees this spring, Extension Forester K. E. Barraclough reports. The State forestry department provided pine trees without charge to 4-H clubs and to high school departments of agriculture, allowing 250 apiece to boys and girls under 16 years of age and 500 apiece to those aged 16 to 21. The recipients were required to plant the trees, or help plant them, on lands of their parents or relatives.

Forestry at St. Lawrence University

Through a gift made by F. L. Carlisle & Co., St. Lawrence University, Canton, N. Y., is enabled to spend $20,000 a year for 5 years for the advancement of forestry in the north country of New York State. The university has employed Floyd M. Callward, recently extension forester of Vermont, as its forester. Mr. Callward's primary duty will be to develop a forestry extension service, through which the university will assist organizations, clubs, schools, and individuals in reforestation work and will cooperate with county supervisors in establishing county forests under the provisions of the Hewitt reforestation act. He will give an elective nontechnical course in general forestry, with emphasis on northern New York conditions, which will include field trips.

This spring the university proved its willingness to practice what it preaches by planting on its own land about 70,000 Norway spruce, northern white pine, and Norway pine. It plans to plant about the same number of trees in the spring of 1930, and to establish a small demonstration nursery.

One Hundred Georgia High Schools Introduce Forestry Teaching and Acquire Demonstration Forests

Forestry has been added to the course of study of 100 Georgia high schools in which vocational agriculture is taught under the provisions of the Smith-Hughes Act, the Georgia Forest Service reports. A demonstration forest of about 10 acres has been leased for the use of each of the schools. The State forest service has surveyed and mapped each of these areas and made a plan for its management. Representatives of the service will visit the school forests two or three times each year and carry on various demonstrations. The State's vocational agricultural department has outlined a series of jobs to be done on the forests by the students. A summer camp is to be held each year for the training of selected students. Each student developing satisfactory proficiency in the work of the camp is to receive a certificate as vocational forester, recommending him for employment in nontechnical forestry work.

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The public schools of Wallingford, Vt., have two forestry demonstration plots comprising about 6 acres of land. One plot located along the main highway north of the village was given to the schools for this purpose by H. J. Fales, chairman of the board of selectmen. Five thousand Norway pine 3-year transplants from the State nursery were set out on the plots this spring.

Research Fellows to Study Grouse and Quail

Research fellowships established by the Sporting Arms and Ammunition Manufacturers' Institute have enabled the University of Minnesota to begin a study of the cyclic fluctuations of ruffed grouse and the University of Wisconsin to begin a study of environmental relations of quail. In these studies it is intended to correlate the management of the game crop with that of timber and agricultural crops. Ralph King has been appointed to the Minnesota fellowship to work under the direction of Royal N. Chapman The Wisconsin fellowship has been awarded to Paul L. Errington, who will work under the direction of Leon J. Cole. H. L. Stoddard, of the Bureau of Biological Survey, will have advisory supervision over both studies.

Michigan Business Men Donate 4-H Club Planting Stock

A group of business men in Grand Rapids helped start the first 4-H forestry club in Kent County, Mich., last year by paying for 1,000 northern white pine and Norway spruce seedlings for each of 25 farm children. In the fall a check-up on the plantings revealed that the average survival was 87 per cent and that three boys had stands averaging 95 per cent. The success of the first year's work led the club's backers to renew their offer in 1929, with the result that 92,375 trees, including equal numbers of northern white pine, Norway pine, and Norway spruce, were planted by 98 children.

In Van Buren County, Mich., where a 4-H forestry club was formed in 1928 on the same plan, each member of the club wrote a letter to the Kiwanian who had provided him with planting stock. A planting demonstration by the State extension forester prepared the boys for the work of planting their trees. In the fall each member was required to exhibit two of his best trees in pots at the local fair.

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A tree-planting ceremony was made a part of the annual 4-H club congress in Mississippi, this year as last, trees being planted by the south and north Mississippi groups on the campus of the State agricultural college in the presence of about 2,000 delegates. A talk on forestry club work was given at a club leadership session by Mrs. Edgerton, State supervisor of forestry education, and plans were laid for cooperation by club members in the woods fire prevention campaign to be conducted by the extension forester in September.

Louisiana 4-H Forestry Club Work

By Robert Moore, Extension Forester of Louisiana

wo types of 4-H club forestry work are offered ouisiana boys. The first calls for the protection arm woodlands from fire by means of fire lines signs, and for farm woodland improvement work. type of work does not produce a direct mone- return unless thinnings are made and the prod- is sold to pulp mills or creosoting plants. Under second plan the boys enroll in junior fire patrols are a part of the State system of cooperative protection. Each patrol is responsible for pre- ing and suppressing fire on from 9,000 to 20,000 s of forest land. Payment is made by the isiana Division of Forestry at the rate of 1 cent acre. Each club makes a division of the money ng its members, reserving 10 per cent for the treasury.

the season of 1927–28, the first year of the junior patrol work, four clubs had an area of 65,000 s to protect. Two of the patrols were organized r the fire season was half over and the period of test hazard past; therefore the number of acres ned, 168, is not a fair index of the efficiency of the ols. For that season the Louisiana Division of estry paid the junior patrolmen wages and bonuses ling $550.

he season of 1928–29 saw 50 boys organized in six ols to care for 109,000 acres. The junior patrol- were paid $875 for their work. The Union Saw- Co., Huttig, Ark., will pay $200 of this amount, an agreement with the Louisiana Division of stry whereby the State and the company agreed pay equal amounts toward the protection of the npany's holdings in Union Parish. The best record a single patrol was the protection of an area of 0 acres with 34 fires and a loss of but 69½ acres.

uring the year 1927–28 W. H. Sullivan, vice presi- t and general manager of the Great Southern nber Co., gave $500 to be used as prizes for for- y club work in Louisiana. With this money 2 s were sent to the National 4-H Club Congress in cago, 5 boys were given trips to the plantations nurseries of the Great Southern Lumber Co. at galusa, La., and 40 boys were sent to their parish camps for one week each. This year $200 provided the Louisiana Division of Forestry will be used as ze money for boys in forestry club work other than t of junior patrol.

orestry club work for boys was not a new thing Louisiana when 4-H forestry clubs were first or- ized there in 1927; in 1925 and 1926 boys' re- estation clubs were conducted by the Louisiana vision of Forestry.

Medals Available for Children's Forestry Contests

Bronze medals to be awarded in state-wide forestry contests of children have been made available by the American Forestry Association. The design, executed in bas-relief, represents the General Sherman tree and companion sequoias. In addition to the medal that is to be awarded in each annual State contest to the winning child, becoming the child's permanent possession, there is a larger one to be presented to the winning child's school or club. This will become the permanent trophy of any school or club that wins it three times.

The American Forestry Association will not participate in the planning or management of contests, leaving this to agencies such as State forest services, State forestry associations, and State colleges. The competition must be state-wide. It may be open to all public-school children or may be limited to high-school children or to Boy or Girl Scouts, 4-H clubs, or other juvenile organizations. The promoting agency is free to decide upon an essay, oratorical, tree planting, or other type of contest.

Agencies interested in arranging for the award of these medals in their States should address the American Forestry Association, 1523 L Street, Washington, D. C.

* * *

The National Council of the Boy Scouts of America, at its nineteenth annual meeting, held in New York in May of this year, adopted the following resolution:

> Whereas the forests of our country are being destroyed four times as rapidly as they are being replaced, and human carelessness is responsible for 60 per cent of the property loss each year through forest fires, a loss involving millions of dollars; Be it
>
> *Resolved*, That we recommend that the Boy Scouts assist in every way the United States Bureau of Forestry in its campaign for conservation, and that the Boy Scout troops engage in tree planting as a good turn to the Nation.

* * *

"A million hammer blows for the prevention of woods fires in Mississippi" was the part Extension Forester Lauderburn asked 4-H boys and girls to take in the observance in that State of Woods Fire Prevention Week, September 16–20. This much hammer work was expected to suffice to nail up the 51,028 posters which the State forest service distributed to the children. Each of the 20,000 club members in the State was expected to put up two of the posters, which warned of losses through woods fires and stressed the value of farm woodlands.

One Year's Progress of Southern Forestry Educational Project

In its first year the forestry educational project that is being carried on in Georgia, Florida, and Mississippi by the American Forestry Association and the forestry organizations of those States has reached audiences totaling 326,302 with lectures and motion pictures. These audiences included 207,469 children. Lectures and motion-picture showings have been given in 60 counties of Georgia, 32 counties of Florida, and 20 counties of Mississippi. This involved 77,913 miles of travel for the five lecture and motion-picture trucks being used in the project.

The project entered its second year in July of this year with six trucks in operation, an additional truck for use in Mississippi having been purchased with funds privately subscribed in Mississippi. To supplement the assortment of forestry motion pictures previously in use, which consists of seven films produced by the United States Department of Agriculture, the American Forestry Association has filmed in the southern pine belt a picture entitled "Pardners," which tells the story of how a small landowner can grow timber as a crop with the assistance of the State forester.

4-H Club Planting in Montgomery County, Tenn.

The black walnut is one of the crops proposed by County Agent G. C. Wright, of Montgomery County, Tenn., for profitable use of the many acres of land in the county that were once used for growing dark tobacco but are now idle. Each farm boy or girl who joins Mr. Wright's 4-H forestry club pl 50 hills of walnuts, two walnuts to a hill. The are planted about 2 inches deep, on land that though fairly fertile is not so situated as to available for cultivation or pasture. The fav situations are in well-drained ravines, along f rows, on rocky rough spots, and around farm b ings. Last fall 10 boys and 10 girls each pla the required 100 walnuts. The local Civitan has authorized prizes of $15, $10, and $5 for forestry club members making the best records this project.

Mr. Wright intends to enlarge his tree-plan program for forestry club members to include setting out of black locust seedlings on idle l formerly used for tobacco growing. Next sp club members will establish locust plantations 250 seedlings each, setting the trees 6 feet apart e way. In some cases walnuts will be planted this at intervals of 36 feet and locusts interplanted in spring.

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On the Sunfish Hills, in Pike County, Ohio, a pr able timber crop is being harvested for the sec time in less than 30 years, Extension Forester D reports. The Breece Lumber Co. has installed a s mill at Latham and is producing 100,000 board of lumber each week for use in rotary veneer w at Portsmouth. When the last big lot of oak, pop and chestnut was cut out of this region, about years ago, a crop of young oak, chestnut, hickory, yellow poplar was left. Where this young gro was protected from fire there are now being cut averaging 12 to 16 inches in diameter.

Forest Service Notes

Water by Motor for Stock Watering and Fire Protection

By **Douglas C. Ingram**, United States Forest Service

On the Deschutes and Ochoco National Forests, which border the "high desert" region of central Oregon, large areas of excellent summer range in the timber remained totally unused until within the past few years because they were without water for stock. The Fort Rock district of the Deschutes at lower elevations merges into a "desert," a high pumice-covered plain. Here, and on a portion of the Ochoco Forest, there is light to medium winter snowfall but no consequent water in summer. As the snow melts the water is absorbed by the loose pumice soil that overlies the porous lava rock, in some places to a depth of many hundred feet, and for miles no evide of water courses is found. In spite of these co tions the areas are covered for the most part with excellent stand of mature western yellow pine aver ing 14,000 board feet per acre, under which is fo a luxuriant growth of secondary vegetation consist mainly of bitter-brush (*Kunzia tridentata*), Id fescue (*Festuca idahoensis*), June grass (*Koele cristata*), wheat grass (*Agropyron spicatum*), needle grass (*Stipa occidentalis*). Long periods summer drought during which the humidity is cessively low make this material highly inflamma and the areas are subject to destructive lightn fires. For years the Forest Service has sought me of reducing the fire hazard and converting this lat grazing resource into useful animal products.

s far back as 1908–9 the Government experimented rilling wells on these areas. Except in one case, drilling was unsuccessful. A plan was then pro- ed for tapping the high alpine Paulina Lakes, ng the water for some 25 miles, and distributing ver the dry territory to the south and east; but ineering difficulties involved in this project made cost prohibitive. Finally, when roads had been t to facilitate the protection of the areas from , the problem of making this large body of ex- ent summer range available for pasturing sheep s solved through the use of the ubiquitous truck portable watering troughs.

n 1918 an enterprising sheepman began hauling ter some 10 miles to his dry range on the Deschutes a. A year or so later water hauling was started Dry Mountain range on the Ochoco Forest. These mples proved so successful that others followed idly. Out of a total area of 402,096 acres wholly ised in 1916, to-day 306,000 acres is profitably used livestock.

he water for this large body of dry range is sup- ed by 14 wells located in a semicircle on the bor- s of the area and southeast of it. The longest ter haul is 29 miles, the shortest 4 miles, and the erage about 8 miles. Four stockmen haul all or rt of their water from irrigation ditches 18 to 25 les from their range; three are supplied from the vernment well at Cabin Lake.

Several different types of hauling equipment have en developed, from a 1-ton truck with a 250-gallon nk to a 3-ton truck having a 1,000-gallon tank uipped with a light centrifugal pump that is useful th for filling the tank and for emergency fire fight- For four trucks having a tank capacity of 460 llons each the cost averaged $1,332.58 per truck. set of nine metal watering troughs cost $191.25, aking the cost of the whole outfit total $1,523.83. apitalizing this investment over a 10-year period ade a cost per head per month of 15 cents. The st of hauling was found to average 5.2 cents per ad per month. On long hauls costs were as high 9.3 cents per head per month; on hauls of 8 iles or less they were held as low as 3 cents per ad per month. All normal costs to the operator e fairly covered by 18 cents per head per month. cidentally, the trucks are used on home ranges ring the winter for hauling feed and supplies; only part of the cost, therefore, is properly chargeable water hauling.

Heavy trucks with 1,000-gallon tanks were found dinarily too heavy for the loose dirt roads traveled, d stockmen generally are favoring a medium- eight truck with a tank capacity of from 300 to 450 llons. Under prevailing conditions such an outfit n be loaded in from three to six minutes.

Galvanized-iron watering troughs are generally used in this work. They vary in size, but are usually 8 feet long, 14 inches deep, and 18 inches wide, and flare at the top so that they "nest" and are easy to move. Eight to twelve of these are placed near the camp and are filled with water while the sheep are away feeding.

Water hauling has converted what was once virtually a timbered desert into excellent summer range that supports 25,000 sheep and 3,000 cattle the summer long. Moreover, the lambs from this long-unused range weigh 71 to 93 pounds when marketed, and their fat is of that firm quality so desirable in the marketable animal. And water hauling coupled with grazing use bids fair to solve one of the knottiest problems of fire protection found on any forest of the Northwest.

Cattle are watered from stationary troughs located at or near the wells, but it is customary to haul water to the sheep, daily or on alternate days, and to move their watering troughs frequently. Some of the bands water at night, the filled troughs awaiting the sheep as they come into camp; the practice that appears to be best for both sheep and range, however, is noon watering, with nightly change of bedground and consequent frequent change of watering place. Constant change in the location of the watering troughs eliminates the danger of overgrazing around the watering place and other undesirable features of the use of a natural or long-established watering place.

In order to save delay in filling the tank trucks it is necessary to store water at the wells. This storage is also an asset in case of forest fire, as are the sheepmen's tank trucks. Experiments are now being made in storing additional water over the various range units so as to reduce the cost of hauling and make additional water supplies available in case of fire.

The amount of water consumed by the sheep on this type of range has been found to vary widely, largely in accordance with the type of feed being used, weather conditions, and management of the stock. Some herders insist that their flocks require water every day, while sheep in other bands seem content and do equally well when watered every second or third day only. Ewes with lambs ordinarily take much more water than dry sheep. Difference in requirements is illustrated in the case of one stockman with two bands using adjoining and similar range, one of 1,100 ewes with 700 lambs and one of 1,200 ewes with 1,100 lambs. The first band required 800 gallons of water per day, or 0.44 gallon per head per day; the second required 1,200 gallons, or 0.52 gallon per head per day. The average requirement for eight bands of ewes and lambs using the Deschutes range was 0.36 gallon per head per day, and on the Ochoco dry range the average requirement was 0.375 gallon per head per day. For a band of dry sheep watered at the Cabin Lake well the average quantity used daily was 0.26 gallon per head.

With few exceptions one camp tender and water hauler has little difficulty in supplying the daily water needs of two bands of sheep, time being allowed for moving the camp and watering troughs to fresh feed.

This type of water development is an up-to-date version of "the house that Jack built." The extreme fire hazard necessitated the building of roads, roads permit the hauling of water, this makes possible the grazing of sheep, and the consumption of forage by the sheep reduces the fire hazard and encourages reforestation of the cut-over area.

Permit Requirement for National Forest Entry Made Necessary by Fire Danger

Orders issued in August by District Forester Kelley, of the Northern National Forest District, required that permits be obtained by all persons entering the Lolo, Missoula, and Bitterroot National Forests, Mont.; the Pend Oreille National Forest, Idaho; or portions of the St. Joe and Clearwater National Forests, Idaho, and the Jefferson National Forest, Mont. This restriction on public use of national forests in Montana and Idaho was made necessary by the very serious fire danger arising from continued dry weather and by the carelessness still displayed by many forest visitors in the use of fire. Unlike previous orders prohibiting entrance to national forests except under permit, these orders were made to apply regardless of whether the person entering the forest intended to build a camp fire. The permit, which was issued by all local national forest officers, bore information as to the portion of the forest the bearer was authorized to enter and his purpose in entering the forest, and was conditioned on his compliance with a set of rules governing the use of fire on the forest. These rules banned smoking except at improved places of habitation and authorized camps. They bound the permittee to try to put out any fire he might discover and if he was unable to put it out to notify a ranger whose address was given on the permit.

Because of the critical forest fire situation throughout the Northwest, a closure order affecting all national forest lands in Oregon and all in Washington except the Snoqualmie and Mount Baker National Forests was issued by C. M. Granger, district forester of the North Pacific National Forest District, effective September 11. The order prohibited travel over trails and camping away from regularly established camp grounds along roads. This is the second time only that such an order has been issued.

Livestock Impounding Regulation held

By D. F. McGowan, United States Forest Servic

The validity of Forest Service regulation T which provides for the disposal of domestic lives found trespassing on national-forest land and no deemed by the owners, is upheld by a Federal dis court decree entered July 2, 1929, at Phoenix, Ar

Regulation T–12 provides that if domestic lives found trespassing on national-forest land is not moved upon notice it may be impounded by the Fo Service. If the owner of the stock is known, wri notice of the impounding is given him; if the own not known, notice is given by publication. In ei case the notice indicates when and where the s was impounded, describes it by brands and o means of identification, and specifies when and w it will be sold in default of redemption. To red their stock owners are required to pay all expe incurred by the Government in advertising, roun up, pasturing, and impounding the stock. Anir not redeemed by the owners are offered at public to the highest bidder, or are otherwise disposed Stock offered at public sale for which no bid is ceived by the Forest Service may be sold at priv sale, or be condemned. If condemned it may destroyed by forest officers.

In the spring of 1927 action was started by Forest Service to rid the Apache National For ranges of trespassing stock. Notice of the tresp was given to the owners so far as these were kno Thereafter such of the trespassing stock as were removed by the owner were impounded and n of the impounding was given as required by reg tion T 12. The impounded animals that were redeemed by the owners were offered at public sa and such of them as were not disposed of at pub sale were offered at private sale. Among the redeemed stock were three horses owned by Conner Trammell. The Forest Service was una to sell these horses. On July 1, 1927, the th horses were shot and destroyed by Ranger J. T. Fea who was acting under instructions of the supervi of the Apache National Forest.

On September 23, 1927, an information was fi in the superior court of Apache County, Ariz., by t county attorney charging Fears with maliciously, lawfully, and wilfully killing a certain brown ma the property of Conner Trammell, contrary to t laws of the State of Arizona. The information w filed under section 602 of the Penal Code of Arizo which provides among other things that any pers who kills any animal, the property of another, sh be guilty of a misdemeanor. A special prosecutor w engaged to present the case against Ranger Fears and est the validity of regulation T–12.

The court held in substance that regulation T–12 was arbitrary and not justified by the general statute of Congress empowering and directing the Secretary of Agriculture to make rules and regulations for the national forests; that it was in contravention of the Constitution of the United States, which provides that private property shall not be destroyed, misused, or taken unless by due process of law. The court declared regulation T–12 unconstitutional and without any basis or foundation in law. Fears was found guilty and was fined $1. Thereupon the case was appealed by Fears to the Supreme Court of Arizona.

On March 19, 1928, the Supreme Court of Arizona reversed the superior court for Apache County, holding that as Fears was an employee of the Forest Service and in shooting the horse was obeying a regulation promulgated by the Secretary of Agriculture he could not be held guilty under the Arizona statute of killing the animal maliciously. The supreme court did not pass upon the validity of regulation T–12, but did direct that Fears be discharged.

In the meantime, at the instance of the Forest Service, an action was brought by the United States in the Federal court for Arizona against the county attorney and sheriff of Apache County to enjoin and restrain them from enforcing or threatening to enforce section 602 of the Penal Code of Arizona so far as it concerned the operation and enforcement of regulation T–12 on the national forests, and asking that this section 602 be adjudged null and void and of no effect so far as it concerned the operation and enforcement of regulation T–12.

On January 12, 1928, Federal Judges Ross, McCormick, and Jacobs, sitting at Los Angeles, Calif., issued an injunction granting temporarily the relief prayed for by the United States. On July 2, 1929, Judge Jacobs made the injunction permanent.

The decree granting the perpetual injunction states that regulation T–12 is a lawful exercise of Federal authority, the laws of Arizona to the contrary notwithstanding; that section 602 of the Penal Code of Arizona is not applicable to the United States and its officers and employees engaged in disposing of livestock impounded under regulation T–12, and that the said section 602, if applied in such circumstances, is contrary to the Constitution and laws of the United States and is void. The portion of the decree granting the perpetual injunction reads as follows:

> That a writ of perpetual injunction be and the same hereby is granted, and the clerk is hereby ordered to issue the same, restraining and enjoining the defendants Dodd L. Greer, as county attorney of Apache County, Ariz., and M. L. Hall, as sheriff of Apache County, Ariz., their deputies ,agents, servants, employees, successors, and all persons acting for them or under their direction or in their behalf, and each and all of them, from interfering with complainant, its officers, agents, and employees in the enforcement of the said impounding regulation T–12 and from enforcing or applying, or threatening to enforce or apply the laws of the State of Arizona, and particularly section 602 of the penal code thereof, against complainant, its officers, agents, or employees, so far as concerns the operation and enforcement of said regulation T–12 on the lands of the complainant in the Apache National Forest in Apache County, State of Arizona, and from arresting and prosecuting the officers and agents and employees of the complainant under said section 602 of the Penal Code of the State of Arizona, or attempting or causing the arrest or prosecution of said officers, agents, or employees of the complainant engaged in rounding up, impounding, selling, disposing of, condemning or destroying under said regulation T–12 domestic livestock found trespassing on said Apache National Forest, in the County of Apache, State of Arizona.

The litigation in State and Federal courts that comes to an end with this important decree was handled for the Forest Service by District Law Officers E. S. French and H. P. Dechant.

French Faces Made Quickly with New Turpentining Tool

By Lenthall Wyman, United States Forest Service

A new turpentining tool developed by the Southern Forest Experiment Station for chipping French faces speeds up the work to such a degree that two French faces can be made in the time required to make one American face. In tests made by the station last year at Starke, Fla., the narrow French face, which is desirable from the standpoint of timber conservation, showed a distinct advantage over the American face in yield. The yield was nearly 20 barrels of spirits per crop. In these tests, however, in which the chipping was done with the tool generally used in France, despite the increased yield the operation was unprofitable because of the low current prices for naval stores and the high labor costs. With the French hack a considerable number of strokes are required to make the face and the process is rather slow. With the new hack fewer strokes are necessary to make a face. This tool requires a stroke similar to that used with the American hack, and unskilled laborers easily learn to use it.

With no greater scarring of the tree the two French faces give higher yields than one American face, and they heal over more quickly. The rate of yield per crop from trees chipped with pairs of French faces is about 40 barrels of spirits or better, which makes the operation profitable even in times of low prices. A new arrangement of gutters and aprons permits the use of a single cup to collect the gum from as many as three French faces, which reduces initial expense and overhead.

National Forest Receipts

Receipts from the national forests reached a higher level in the year ending June 30, 1929, than in any preceding year, totaling $6,299,801. The gain over the receipts of the fiscal year 1928 amounted to $858,201. Sales of timber and turpentine brought in $4,099,966; livestock grazing fees, $1,726,253; permits for special uses of land included in the forests, $287,119; and water-power permits, $113,227. The amounts received in the form of fines for trespass included $47,063 collected from persons found to be responsible for starting forest fires.

The share of national forest receipts of the fiscal year 1929 that will be turned back by the Federal Government to the counties in which the forests are situated, for roads and schools, will be approximately $1,605,882, or about $200,000 more than the amount so paid for any previous year.

Technical Grazing Personnel in the Forest Service

By W. R. Chapline, United States Forest Service

It was 22 years ago that technically trained grazing men were first appointed to the Forest Service. The first appointees were James T. Jardine and Arthur W. Sampson. A little later C. E. Fleming, W. A. Dayton, and A. E. Aldous were added. Some other additions were made in 1911, and a considerable number were made in 1914. The war depleted the ranks, and in 1919 it became necessary for the service to go back almost to the beginning in building up a technical grazing personnel. At the end of June, 1929, however, the Forest Service personnel included more than 100 men who had passed the civil service examination for junior range examiner (formerly grazing assistant).

Of these men 14 are in research positions and the remainder are in administration. The latter group includes 1 man in the Washington office and about 11 in the district offices, 10 supervisors, 8 assistant supervisors, 16 other technical specialists on supervisors' staffs, and a number of rangers. Only 16 of the administrative men took the examination before 1920.

The question is often raised whether the civil service examination provides a useful indication of a man's ability. While there is no question but that some men fail to give a just representation of their abilities in an examination, in analyzing the records of 100 of our grazing men as to development, advancement, and grade of work I find that these records have usually borne out the ratings given in the junior range examiner examinations. M analysis covers nearly all the Forest Service me who passed the examination in the 12-year perio 1915–1926, including as many as possible of thos who have now left the service. Men who entere Forest Service grazing work before 1915 wer omitted because they have all had a much better tha average chance to advance; those who have entere since 1926, because there has hardly been time fo a thorough test of their ability. A few men wer ruled out of consideration because their records wer not clear or because I did not know their work wel enough to rate it. The men were classified into fou arbitrary grades: (1) exceptional, (2) better tha average, (3) average, and (4) below average.

Each eligible list was divided on the basis of examination grades into first and second halves. O the 53 men who were in the first half of their respective lists and who could be rated, in my judgment 11, or 20 per cent, have proved exceptional 39 (including the 11 exceptional men), or 74 per cent have proved better than average; and 51, or 96 per cent, have proved average or better. Only 2 in the upper half have proved to be below average. Of the 47 men in the second half of the list who could be rated, 2, or 4 per cent, have proved exceptional; 16, or 34 per cent, better than average; and 30, or 64 per cent, average or better. The remaining 17 lower-half men fell below average in accomplishment.

Doubtless two of the most important factors in the advancement of technical grazing men have been the demand for men trained in range management and the fact that, until recent years, most of the men entering from the examination were given at least a year of experience in grazing reconnaissance and management-plan development under the supe vision of a trained man. Other important factors have been the personal interest shown in the development of these men by the grazing men of the district offices and the help and encouragement afforded them, particularly in their early years in the service, by close inspection of their work.

Reproduction on Cut-Over Spruce Lands

In a study covering several hundred sample plots in the spruce lands of the Northeast, the Northeastern Forest Experiment Station has found cut-over lands generally well stocked with spruce and fir reproduction. Nearly all the reproduction had been present in the stands prior to cutting. The quantity of reproduction was greater in the spruce-flat type than in the spruce-hardwood type, and greatest in the spruce-slope type. In general, the largest number of spruce and fir seedlings were found on the areas had originally supported the largest volume of ce and fir.

ompeting hardwood growth is the most disturbing le factor operating to prevent the final establish- t of spruce and fir on cut-over spruce lands. re beech and sugar maple form an appreciable ion of the stand any type of cutting, unless it is wed by special cultural treatment, results in d encroachment of hardwoods on areas formerly pied by spruce and fir. Clear cutting of spruce fir halts additional restocking of these species many years following cutting, whereas prolific ing of large residual hardwoods results in the blishment of much additional hardwood growth. some instances promiscuous cutting of young vth may be chiefly responsible for the conversion ormer mixed spruce and hardwood stands into hardwood stands.

hanges resulting from clear cutting are found esult in the dominance of fir over spruce, although he undisturbed forest the spruce maintains its inance without much difficulty.

A Cold Tub for Lodgepole Poles

cold bath of creosote is better than a hot one treating telephone stubs cut from standing dead epole pine, Ranger H. R. Elliott reports after two rs' experience in creosoting such stubs at the Bear ey Ranger Station, Malheur National Forest, Oreg. eated the creosote soaks clear to the center of the for a foot or more from the bottom before it etrates the remainder of the treated portion of the to the required depth of 1 inch. The cold-bath od takes a little more time but gives more even tration, producing equally good results with a ing of about one-third of the creosote required by hot-bath method.

tubs cut from standing dead western larch will not the creosote, Ranger Elliott finds. A tankful of h stubs that were cooked for 10 hours and left the creosote three days longer showed only from nch to $\frac{1}{16}$-inch penetration.

* * *

Hunters licensed by the State of Arizona this year e permission to kill deer on the Kaibab National est, Ariz. Under an agreement of the Arizona me and Fish Commission and the United States rest Service each hunter will be permitted to kill deer, only one of which may be a buck, within period October 1 to December 15. A fee of $1.50 o be paid to the Forest Service by each person ening the forest for the purpose of hunting and kill- deer.

Good Stands on Old Indian Village Sites In Alaska

By R. F. Taylor, United States Forest Service

With the advent of the white man in southeastern Alaska many Indian villages were abandoned, the villagers being drawn away to a more exciting life in the towns of the whites. These old village sites are now covered by second-growth forest stands, in many cases of excellent quality, presenting examples of the type of stand that might be approached if complete utilization were effected on timber sales and the soil well broken up.

The forests of Alaska have a raw humus layer somewhat similar to that of Scandinavian forests. As Hesselman points out, if such a forest is clear cut and the cut-over land is allowed to lie uncovered this acid mat quickly decomposes and nitrogen formation takes place. This is not absolutely necessary for natural regeneration, but results in better growth. On the Indian village sites, exposed to light and insolation for many years during occupation and then abandoned to regenerate, this treatment has brought about not only better growth of the new stands but a desirable change in composition of stand, with higher percentages of Sitka spruce and lower percentages of the less exacting western hemlock. When I commented on this to a tourist he replied, "Well, now, ain't it the truth that hundreds of them Indians are buried back there under them trees?"—If this is part of the explanation we can not hope to duplicate such stands!

The Airman's Cigarette Butt is Dangerous

Burning cigar or cigarette butts dropped from airplanes in motion may be a source of forest-fire danger, according to Forest Service experiments carried out in June of this year at Spokane Airport, Spokane, Wash. The tests were made in clear weather, when the air temperature was about 75°, relative humidity about 34 per cent, and wind movement about 7 miles an hour. The cigarettes used were factory made, with plain tip. Both they and the cigars were of brands in common use. The butts were thrown from a forest-patrol plane at altitudes of approximately 500 feet and 1,000 feet above ground. To enable observers to trace the butts in their fall a streamer of bright-colored cotton cloth, 2 to 3 feet long and about 1 inch wide, was attached to each. Of six cigar butts dropped five were recovered. Every one of these was burning when picked up from the field. Six out of seven cigarette butts were recovered, and of these four were still burning when picked up.

Flight of Douglas Fir Seed

Even when the seed crop is light, a typical stand of Douglas fir in the Northwest may scatter a good proportion of its seed to a distance of 800 feet over adjoining cleared land, according to a count made by Leo A. Isaac of the Pacific Northwest Forest Experiment Station. The count was made near Wilark, Oreg., on rolling ground between the Columbia and Upper Nehalem Rivers. Rodent-proof seed traps 4 feet square were placed on the cleared land at 100-foot intervals, lined in the direction in which the wind most commonly blew during the fall and winter. The timber was a typical stand of Site II thrifty Douglas fir with a light mixture of hemlock and cedar.
It was approximately 225 years old and 210 fe
height. Cutting and slash burning had taken
in the four years preceding the study. At a distan
100 feet from the edge of the timber a distributi
40,600 sound seed per acre was indicated; from
point to a distance of 800 feet, the fall of sound
was found to range from 17,000 to 3,000 per
The seed production of hemlock and cedar was
slight during the year of the study, and all b
small percentage of the seed caught in the traps
of Douglas fir. Seed fall started about Septemb
and 88 per cent of the sound seed collected
found in the traps before the end of October; s
seed were found, however, as late as April of
following spring.

General Forest News

Silviculturists of Many Nations Meet at Stockholm

(From a report by EDWARD N. MUNNS, United States Forest Service)

The seventh congress of the International Union of Forest Experiment Stations, which except for the outbreak of war would have taken place in Hungary in 1914, was held with marked success in Stockholm, Sweden, July 21–27, 1929. This was the first meeting of the union since 1910, when it convened in Brussels. About 180 delegates attended, representing the following countries: France, Spain, Denmark, Holland, Italy, Germany, Switzerland, Russia, Poland, Finland, Norway, Japan, Bulgaria, Egypt, Chile, Rumania, Czechoslovakia, Austria, Hungary, Yugoslavia, Greece, Esthonia, Latvia, Java, India, Canada, Scotland, South Africa, Cypress, England, Belgium, Australia, Portugal, Sweden, the United States.

Henrik Hesselman, head of the Swedish Forest Experiment Institute, was president of the congress and chairman of the organization committee. French, German, and English were the official languages. The meeting place was the college of forestry.

A new constitution was adopted, reorganizing the union to include in its field all forest research, admit all organizations engaged in forest research, offer membership to individuals, and appoint a permanent secretary and a permanent executive committee.

The question of an international forestry bibliography was one of the important subjects discussed. A committee of five headed by Professor Oppermann, of Copenhagen, was appointed to work for a uniform classification of forestry literature. Each country
is asked to publish the bibliography of its own
estry literature down to 1930 and to send in
nually to the secretary of the union a list of pa
published during the year. Library cards in th
ficial languages of the union are to be prepare
subscribers. Objects toward which the union
work include bringing together information on
technique used in forest research and correl
such information so as to facilitate adoption of
tices best suited to local conditions, and encoura
the use of seed of known origin for forest pla

The permanent committee elected to take c
of the affairs of the union for the next three
consists of Philibert Guinier, Nancy, France,
dent; Gyula Roth, Sopron, Hungary, vice presi
Ludwig Fabricius, Munich, Germany; R. C. R
son, London, England; Aldo Pavari, Florence, I
Henri Badoux, Zurich, Switzerland; Wladislaw
linski, Warsaw, Poland. The permanent secre
chosen to serve during the same period is Sve
trini, of the Swedish Forest Experiment Insti

Both before and after the week of meetings, vis
foresters were conducted on excursions to the Sw
experimental forests, State forests, and private
ests, and to woodworking plants. These gave a
portunity to see much of what the Swedish fore
are doing in all lines of silvicultural work, and
kinds of devices used in logging and forestry
tices. With wonder the delegates from the U
States and other "backward" nations tra
through a country where half the land is for
and nearly all forests are under management. w
the rivers are full of logs and yet the woods, la
untouched by fire, look as if they had not

uched by human hand or foot. These trips, like e meetings, proved Doctor Petrini a genius for ganization. Confusion and delay were unknown, id the delegates' baggage found its way about with agical precision.

Americans attending the congress included Henry Baldwin, Brown Co., Berlin, N. H.; P. R. Gast, arvard University; Joseph Kittredge, jr., Lake ates Forest Experiment Station; Barrington Moore, ology, Washington, D. C.; Edward N. Munns, ffice of Forest Experiment Stations, United States orest Service; Alfred J. Stamm, United States Forest roducts Laboratory; James W. Toumey, Yale School Forestry; S. A. Waksman, New Jersey Agricultural xperiment Station; and K. W. Woodward, University of New Hampshire.

The next meeting of the union will be held in rance in 1932, and the next following that will be eld in Hungary in 1935.

Iississippians Incorporate to Grow and Market Timber

From Starkville, Miss., comes news of the organiza-on of a stock company for the purpose of growing id marketing timber. The company, known as the uthern Forest Preserves (Inc.), has an authorized pitalization of 5,100 shares, of which 100 are 7 per nt noncumulative preferred and 5,000 have no par lue. The charter lists the principal purposes of the mpany as "to encourage the preservation, propaga-on, culture, and growth of timber; to practice selec-ve cutting, clear cutting, and other methods of cut-igs, and marketing of timber at times and places and der such conditions deemed advisable by its govern-g authorities; to own, control, and manage tracts woodlands and other lands and to lease the same." a secondary activity is mentioned the practice of riculture on cultivable portions of lands that may acquired by the company.

Among the incorporators are H. O. Jones, secretary the Starkville Chamber of Commerce, and D. E. underburn, State extension forester.

Iichigan Kiwanis Forest Plantation Now Covers 10,000 Acres of Government Land

Kiwanis clubs of Michigan, who paid last year for e labor required to plant trees on 5,000 acres of e Huron National Forest, Mich., did not feel that ey had done too much for reforestation when they oted a bill for $9,700. This year they paid for the anting of another 5,000-acre tract on the national rest, and they express the hope to provide for additional planting in coming years. On August 30 representatives of the State and Federal Governments met with Kiwanians to dedicate the 10,000-acre Michigan Kiwanis Forest Plantation, which is located near East Tawas, Mich.

Bernheim Forest Established in Kentucky

Thirteen thousand acres of Kentucky land 25 miles south of Louisville has recently been placed under forestry management as the private estate of Isaac W. Bernheim. Mr. Bernheim, now a resident of Denver, was in business in Louisville for 50 years and has long planned to establish in Kentucky a forested estate such as those of his native Germany. The land lies in Bullitt and Nelson Counties, on the Springfield branch of the Louisville & Nashville Railroad, and has its northern boundary near Clermont.

In preparation for developing the estate the committee acting for Mr. Bernheim had a study made of the area by John Lafon, consulting forester of Vancouver, B. C., who is a native of Kentucky. Mr. Lafon described the tract as mostly knob land, with long, low ridges separated by valleys. Until about 40 years ago it was heavily timbered with mixed stands of oak, hickory, ash, poplar, walnut, and beech, with pine growing on the poorer soil on dry ridges. Practically all the merchantable timber has now been cut. In spite of repeated fires, there remains a fair stand of young timber. The humus layer that formerly overlaid the yellow clay soil has been either burnt or washed away. On the average the soil is not very deep.

Ronald B. Craig, a graduate of the New York State Forest School who has had experience in Government forestry work, was employed as forester for the estate, and organized a permanent fire patrol of seven men. Farmhouses at various points on the tract have been put to use as stations and living quarters for these men, and are being connected by telephone with a 47-foot steel observation tower that has been erected on the highest point on the estate. Thirty-foot firebreaks have been cut through parts of the property. The whole estate is to be fenced and closed to hunting.

Management plans call for the removal of defective trees and trees of less valuable species, and for the planting of trees on 1,110 acres of abandoned and eroded farm land. Fertile fields along Wilson Creek will be cultivated to form a natural firebreak and to provide employment for tenants.

After about a year, when roads and trails have been sufficiently developed, the estate will be opened to the public for recreational use. It will be maintained perpetually, under the Isaac W. Bernheim Foundation (Inc.), as a forest and a wild-life sanctuary.

Another Big Year for the Wood Preservers

Statistics compiled by R. K. Helphenstine, jr., United States Forest Service, on the quantity of wood treated and wood preservatives used in the United States in 1928 embody reports from all the 193 wood-preserving plants that were in active operation in this country during the year. This is the twentieth consecutive year in which such statistics have been compiled by the Forest Service in cooperation with the American Wood Preservers' Association. The number of plants in operation was greater by six in 1928 than in 1927. It included 125 plants of the pressure cylinder type, 55 nonpressure (open-tank) plants, and 13 plants equipped for both pressure and nonpressure treatment. New plants constructed in 1928 numbered 10.

In 1928 the 193 plants gave preservative treatment to 335,920.379 cubic feet of wood. This is 9,765,425 cubic feet less than the quantity they had treated in 1927, but 46,598,300 cubic feet more than they had treated in any other preceding year. Decreases from the record-breaking figures of 1927 were shown by crossties, wood blocks, and switch ties. In 1928 the plants treated 210,343,215 cubic feet of crossties as compared with 222,695,520 cubic feet in 1927; 3,676.312 cubic feet of wood blocks as compared with 5,271,420 cubic feet in 1927; and 14.533.450 cubic feet of switch ties as compared with 15,200,934 cubic feet in 1927. The decrease in the volume of these products treated was partially compensated by an upward trend in the quantities of wood treated in the form of construction timbers, piling, cross arms, and poles.

Of the 70,144,405 crossties treated in 1928 more than 58 per cent were adzed or bored or both in advance of preservative treatment.

Although the plants treated a smaller quantity of timber in 1928 than in the previous year, they used a greater quantity of preservative material. The creosote used amounted to 220,478.409 gallons, which was an increase of 699.979 gallons over the previous high record of 1927. The 25,075,903 gallons of petroleum [1] used represented an increase of 2,164,769 gallons over the quantity used in 1927, and the 23,524.340 pounds of zinc chloride used was 1,361,622 pounds more than the 1927 consumption. Treatment of wood paving and flooring blocks required 2,347,518 gallons of paving oil in 1928, whereas in 1927 only 1,389,465 gallons of this preservative was so used.

In 1928 domestic creosote made up 62.8 per cent of the total quantity used by the wood-preserving plants, as against 58.6 per cent in 1927.

The distribution of the 207 wood-treating pla in existence in the United States at the close of 19 by classes and types, was as follows:

Location	Commercial plants [1]			Railroad plants [2]			Private plants [3]		
	Pressure	Nonpressure	Pressure and nonpressure	Pressure	Nonpressure	Pressure and nonpressure	Pressure	Nonpressure	Pressure and nonpressure
Region No. 1:									
Maine	----	1		----	----	----	----	----	----
New Hampshire	1	1	----	----	----	----	----	1	----
Massachusetts	1	1	----	1	----	----	----	----	----
Connecticut	1	----	----	----	----	----	----	2	----
New York	3	----	----	----	----	----	----	1	----
Pennsylvania	3	----	----	3	----	----	3	----	1
New Jersey	3	----	----	1	----	----	----	----	----
Maryland	----	----	----	----	----	----	----	1	----
Virginia	4	4	----	1	----	----	----	----	----
West Virginia	----	1	----	1	----	----	----	----	----
Total	16	8	0	7	0	0	3	5	1
Region No. 2:									
Kentucky	2	----	----	1	----	----	----	----	----
North Carolina	1	1	----	1	----	----	----	----	----
South Carolina	2	----	----	----	----	----	----	----	----
Tennessee	2	1	----	----	----	----	----	----	1
Georgia	5	----	1	1	----	----	1	----	----
Alabama	4	----	1	----	----	----	1	----	----
Florida	2	----	----	2	----	----	----	----	----
Mississippi	8	----	----	1	----	----	1	----	----
Louisiana	9	----	----	----	----	----	1	----	----
Texas	6	----	----	3	----	----	----	----	----
Arkansas	1	----	----	----	----	----	----	1	----
Oklahoma	2	----	----	1	----	----	----	----	----
Total	44	2	2	10	0	0	4	1	1
Region No. 3:									
Ohio	6	3	----	----	----	----	----	1	----
Michigan	----	2	1	2	----	----	----	1	----
Indiana	6	----	----	----	----	----	----	----	----
Illinois	9	----	1	1	----	----	----	2	----
Wisconsin	2	----	----	----	----	----	----	----	----
Missouri	3	----	----	----	----	----	----	----	----
Minnesota	1	10	1	1	----	----	----	----	----
Total	27	15	3	4	0	0	0	4	0
Region No. 4:									
Montana	----	----	----	2	----	----	----	1	1
Wyoming	----	----	----	3	----	----	----	----	----
Idaho	----	7	----	----	----	1	1	----	----
Colorado	1	----	1	----	----	----	----	1	----
Arizona	----	----	----	----	----	----	3	1	----
New Mexico	----	----	----	2	----	----	----	----	----
Total	1	7	1	7	0	1	4	3	1
Region No. 5:									
Washington	4	6	----	----	----	----	----	----	----
Oregon	1	2	----	----	----	2	----	----	----
California	----	3	----	2	----	1	----	4	----
Total	5	11	0	2	0	3	0	4	0
Grand total	93	43	6	30	0	4	11	17	3

[1] Plants that treat wood for sale or by contract.

[2] Plants owned by railroads and operated by them mainly for t treatment of railroad material.

[3] Plants owned by light and power companies, mining compani etc., and operated by the companies to supply their own requirement

* * *

The Metropolitan Park Board of Cleveland, Ohi this spring set out 100,000 forest trees in permane location on the lands under its control and tran planted more than 300,000 seedlings in its nursery.

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[1] All the petroleum used was employed as a diluent for creosote. Petroleum was used principally in the treatment of crossties and switch ties.

Railroad Stops Locomotive Fires

The number of fires caused by locomotives or steam ovels in the woodlands of the Lehigh Coal & avigation Co., near Lansford, Pa., stood at zero 1928 and in the spring fire season of 1929, accord- g to a report of the company's forester, A. C. eumuller. The company has 97 locomotives and eam shovels in operation daily in and near its ,000-acre woodlands, and about 27 additional loco- otives are operated in and near them by railroad mpanies. In 1916, 106 fires were caused on these nds by locomotives and steam shovels, constituting per cent of all fires on the lands. A gradual reduc- on in the number of fires so caused has rewarded the mpany for rigidly inspecting spark arresters during re seasons, carrying on fire prevention educational tivities with its own employees and with sportsmen d others, and in the past seven years constructing pproximately 20 miles of safety strips which are urned every spring.

For fire-suppression purposes this company has or- anized fire crews at its collieries and maintains a ained force of forest rangers which it can transport apidly to all fires.

Railroad Reduces Damage Claims by Fire Protection Campaign

By John L. Cobbs, Jr., Atlantic Coast Line Railroad Co.

The amounts paid by the Atlantic Coast Line Rail- road Co. as damages for fires originating on or near right of way have fallen off greatly since the summer of 1927, when the company instituted its campaign to prevent and suppress fires. At that time a set of rules was issued to the road's employees designed to minimize fire danger from the operation of locomotives, from disposal of fuels and ashes, and from burning of waste materials. It was ordered that the right of way be kept clear of inflammable material. Placards were placed in the smoking compartments of coaches warning the public against throwing lighted smoking materials from train windows. Train crews were instructed to report all fires seen on or near the right of way to the nearest agent or section crew. Agents were instructed to make reports of any fires coming to their notice to the nearest section crews, to fire wardens of the States in which the fires occurred, and to the company's chief claims attorney. Section crews were required to extinguish fires reported to them and to cooperate with members of the State forest services whenever possible. The practice was adopted of having a claims examiner go to the scene of each fire as soon as the fire was reported in order to obtain statements from persons having knowledge of the facts in the case and establish whether or not the railroad was responsible for the fire.

During the first 12 months of the campaign payments of fire damages were reduced to less than one-seventh of the amounts that had been paid during the preceding year. During the second year further progress was made: up to June 1, 1929, payments amounted to only about 6 per cent of the losses for the corresponding period in 1926–27. (The latter figure is subject to slight change as pending claims are settled.) During the first year of the campaign weather conditions were very favorable; during the second year they have been normal.

The reduction in damages paid is attributed by the company largely to more accurate determination of responsibility for the origin of fires occurring on or near its right of way. Heretofore, officials of the company believe, the company has paid fire damages in many cases in which the claims against it were unfounded, especially in instances in which claims arose so long after the fire that determination of the starting point of the fire was impossible.

Rules for the Hygiene of Portable Pumps

No portable pump ever got along well—

(1) On a diet of gasoline alone. The 2-cycle pumper needs a sweetening of oil, well mixed with the gas.

(2) With sand in its circulatory system. Keep the end of the suction hose suspended at least a foot above the bottom, or, if the sump is shallow, place the end of the hose in a can or on a submerged sheet of canvas.

(3) With a gummy carburetor. When discontinuing use, shut off the gas at the tank and let the engine drain the carburetor dry.

(4) With "frozen" rotors. Drain the pump dry and pour a little oil into it (rotating it by hand afterwards) before putting it away.

* * *

Twenty-five years' use has worn out the rails of street-car tracks on Main Street, Memphis, Tenn., but has left no sign of decay or deterioration on the pine ties that carry the rails, the Southern Pine Association reports. The steel rails, laid in 1904, are now being replaced, but the ties are merely being turned over. J. H. Haylow, chief engineer of the Memphis Street Railway Co., anticipates that they will give 25 years' more service. These ties were among the first to be treated with preservatives at the plant of Ayer and Lord at Grenada, Miss.

Dawes Wood

A 293-acre tract of forest land in central Ohio has been set aside by Mr. and Mrs. Beman G. Dawes as an arboretum controlled by a self-perpetuating board of trustees. Mr. Dawes is chairman of the board of directors of the Pure Oil Co. and a brother of Ambassador Charles G. Dawes. The new arboretum, known as Dawes Wood, is situated about 9 miles south of Newark, Ohio, on State Highway No. 13, a highly improved roadway connecting Lake Erie and the Ohio River, and 2 miles north of the National Pike or Cumberland Trail, United States Route No. 40. The purpose of its establishment is stated in the deed as follows:

> To encourage the planting of forest and ornamental trees and to demonstrate the value of the different varieties of trees for these purposes; for practical and scientific research in horticulture, but particularly in the growth and culture of trees and shrubs able to support the climate of the State of Ohio, and to increase the general knowledge and love of trees and shrubs and bring about an increase and improvement in their growth and culture.

It is planned through the planting of individual trees in the arboretum to establish memorials to distinguished men.

The tract is reported to represent many different kinds of soil and to support a stand of timber including more than 100 native tree species and varieties.

A White Pine to Read About

Thirty logs making up a total of 6,255 board feet of timber were cut from a white pine felled in 1912 by George H. Jones at New Durham, N. H. Above 21 feet the tree divided into three prongs. Figures for the length and content of the logs were recorded by Mr. Jones as follows:

	Length	Content
	Feet	*Board feet*
3 logs	16	1,890
4 logs	14	1,140
9 logs	12	1,610
6 logs	10	745
3 logs	9	555
4 logs	8	90
1 log	5	225
Total		6,255

❦

Newsboys of Helena, Mont., in preparation for their annual week's outing at Camp Miracle this summer voluntarily pledged themselves to refrain from smoking while at camp and on their hikes into the near-by forests.

President Hoover Specifically Exclude Forests and Parks from Public Land Disposal Policy

In his letter in regard to the Public Domain lan and the Reclamation Service, addressed to Assista Secretary of the Interior Joseph M. Dixon, and rea before the Conference of Governors of Public La States, Salt Lake City, August 26 and 27, Preside Hoover specifically excluded forests, parks, and India reservations from his tentative plan for the dispos of public lands. Those parts of the letter which refe to the forests read as follows:

> The most vital question in respect to the remainin free public lands for both the individual States an the Nation is the preservation of their most importa value—that is grazing. The remaining free lands c the public domain (that is, not including lands re served for parks, forests, Indians, minerals, powe sites, and other minor reserves) are valuable in th main only for that purpose.
>
> The first of the tentative suggestions, therefore, i that the surface rights of the remaining unappropriated, unreserved public lands should, subject to certai details for protection of homesteaders and the smalle stockmen, be transferred to the State governments fo public-school purposes and thus be placed under Stat administration.
>
> At the present time these unappropriated land aggregate in the neighborhood of 190,000,000 acre and in addition some 10,000,000 acres have been withdrawn for purposes of stock watering places and stoc drives which might be transferred as a part of program of range preservation. In addition, som 35,000,000 acres have been withdrawn for coal an shale reserves, the surface rights of which with prope reservations might be added to this program of rang development in the hands of the States. * * *
>
> Practically none of these lands can be commercial afforested, but in any event the forest reserves cou be rounded out from them where this is desirable * * *
>
> It is not proposed to transfer forest, park, Indian and other existing reservations which have a distinctly national as well as local importance.

❦

The forestry program adopted by the directors of the National Lumber Manufacturers Association in their August 9 session at Longview, Wash., recommends that each timberland owner make an economic study of the forest-growing possibilities of his land, and offers the assistance of the association's forestry and other departments in the making of such studies.

❦

Permits are required for the importation of chestnuts and acorns from any source under an order issued by the Secretary of Agriculture, effective September 1. Heretofore this requirement has applied only to chestnuts and acorns of European origin. The purpose of the order is to prevent the entry of injurious insects.

se Subcommittee Inspects National Forests

Agricultural Subcommittee of the House Com-
on Appropriations made an inspection of na-
forest work in the West during July and Au-
The members of this subcommittee are: L.
ckinson, Iowa; J. P. Buchanan, Texas; J. N.
in, Louisiana; and J. W. Summers, Washing-
Accompanied by the Chief Forester the sub-
ittee visited the Northern, the North Pacific
California, the Intermountain, the Lake States,
the Alaska National Forest Districts, several
ne forest experiment stations, and the Forest
ucts Laboratory. The party went into the woods
nspected the work of the Forest Service on the
nd. They also held hearings, inviting all who
ed to make a statement to the committee on any
of work with which it is concerned to do so.
severe fire season enabled this committee to get a
g impression of the difficulties and problems
ected with fire-protection work on the forests.

A study of trends of rail traffic in the United States made recently by M. O. Lorenz, director of statistics of the Interstate Commerce Commission, showed that forest products constituted 11.61 per cent of the aggregate tonnage originated in 1900, 12.53 per cent in 1904, but only 7.52 per cent in 1928. Manufactured articles and miscellaneous articles other than agricultural, livestock, mine, and forest products composed 18.32 per cent of the total tonnage in 1900 and 24.26 per cent in 1928.

* * *

Rison, a town of some 685 population in southeastern Arkansas, has a mayor who advocates and practices timber growing. The mayor, Finch Culpepper, owns about 1,200 acres of forest land in the neighborhood of Rison, all of which he protects from fire. Under the direction of H. S. Hinson, county agricultural agent, Mayor Culpepper is conducting a thinning demonstration on an acre of his pine timberland located 3 miles east of Rison on the Randall road.

Foreign Notes

Forests of Venezuela

rest and grassland occupy in approximately
l measure the area of nearly 400,000 square miles
ded in the Republic of Venezuela, writes Lewis
ummings in Tropical Woods. Although Venezu
's wholly in the Tropics, because of its topogra
it enjoys a variety of climates. The heart of the
try is occupied by the savannahs of the great
oco Basin: flanking these are hills and high moun-
s for the most part covered with forests.

the lower zones and hot lands where rainfall is
ty and unevenly distributed through the year
r the "dry forests," in which cacti are abundant
lianas are entirely absent. These forests com-
e about 15 per cent of the total forested area.
class of dry forest is composed mainly of thorny
s and shrubs; in some places there are nearly
forests of a giant cactus known as Cardón, which
source of a yellowish lumber used locally to make
rs and small tables. The second class is chapar-
occurring in certain very dry regions of the in-
r at altitudes generally less than 3,000 feet.

ransition forests, differing from the dry forests
e abundance of lianas and in the absence of cacti
thorny trees and from the rain forests in the
dominance of deciduous species, occupy about
er cent of the timbered area and contain from
5,000 to 10,000 board feet of timber to the acre. In some places palms are abundant and very conspicuous. In general these transition forests occur between the dry forests of the low country and the temperate forests on the high regions. They cover a large portion of the drainage around Lake Maracaibo south of the dry forests; the southern slopes of the Cordillera de Mérida between elevations of 2,500 and 8,000 feet; the vicinity of Carabobo and Yaracuy; and the immense territory of Guayana in the southern part of Venezuela. The soils are generally deeper and richer than those in the dry forests, the ground cover of weeds, ferns, etc., is not heavy, and the forest floor is very rich in humus, litter, and duff. Extensive areas have been cut over in the Lake Maracaibo region and around Carabobo and Yaracuy. The lands are well suited for agriculture. The transition forests contain trees that produce rubber, balata, and chicle.

In the rain forests of Venezuela, as in those of other tropical countries, some of the trees reach enormous proportions and their crowns, interlaced with lianas and crowded with epiphytic plants, form a canopy over successive stories of smaller trees. Little sunlight reaches the ground. The forest floor is perennially damp and is covered with decaying vegetation. The rain forests occupy regions of heavy precipitation on the lower slopes of the Andes southward of Lake Maracaibo, in the valley of the Tocuyo, in the

Amacuro Delta and the eastern part of the country near the British Guiana border, and in the great southern area that adjoins Brazil and includes the divide between the Orinoco and Amazon drainages. The rain forests comprise nearly half the forested area. Their average stand is estimated at about 10,000 board feet per acre.

In colder regions occur temperate rain forests, which differ noticeably from the tropical rain forests in the absence of lianas. They are found at comparatively low altitudes in the Colonia Tovar and at higher elevations in Sierra de Perija and the Cordillera de Merida. They comprise about 5 per cent of the total forest area. The temperate forests are well developed in the populated districts of the Andes, but their composition is only imperfectly known.

The Orinoco savannahs or llanos cover 123,000,000 acres, an area four times that of the State of Pennsylvania. The lands, especially the central and northern portions, are flat or gently rolling. The forests are scattered and open, and consist of only a few species.

There are between 250 and 300 kinds of timber trees in Venezuela, representing the widest possible range in structure, properties, and utility. Many of them are used locally, but only a few are exported. Among the latter are zapatero (West Indian boxwood), cedro (cedar), caoba (mahogany), vera, guayacán (lignumvitæ), roble colorado, granadillo (partridge wood), and bálsamo. The Venezuelan timber best known on foreign markets is the zapatero, and the most valuable forest product exported is balata gum. The country's timber resources have been little exploited commercially, and most of the lumber consumed in the larger centers of population is imported from the United States.

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J. Reynard, writing in Bois et Resineux, attributes the Graf-Zeppelin's failure in its second attempt at a transocean flight to the mistral, and proceeds to discuss the origin of this northerly wind that blows across central France. Says M. Reynard:

> The Greek historian Alexander affirms that the mistral was unknown in Provence before the deforestation of the Cevennes. * * * The difference between the climate in the south of France and that in the northwest creates a permanent air current, which traverses the central plateau. So long as this plateau was normally forested the speed and violence of this wind was no more than is usual in cases of such atmospheric displacement. But after the deforestation of the plateau and of the valleys of the tributaries of the Rhone, the air passing through these defiles was compressed forcibly between the denuded mountains and emerged in the valley of the Rhone and in Provence blowing at the rate of 80 kilometers an hour. It was against this wind that the Zeppelin was unable to make headway.

A Control for Phacidium Blight Conifers

(From report by J. H. Faull to the Canadian Soci Forest Engineers)

Phacidium blight of conifers can be easily cheaply controlled in nurseries through late fall s ing with lime sulphur.

In various parts of eastern Canada and o Northeastern States this blight attacks spruce, p firs, arborvitæ, hemlock, and Douglas fir. The fir various spruces are especially susceptible to it. disease makes its attack on foliage below the cover, and is favored by a cover of snow that sists throughout the winter. It is capable of sp ing rapidly and causing great losses. Few fi spruce trees attacked by it escape destruction u their leaders are well above the surface of the s It is caused by a form or forms very similar to i identical with Phacidium infestans, which is sai cause the " Schneeschütte " that attacks Scotch pi Europe.

Foliage affected by Phacidium blight assumes a and more or less glaucous brown color. In cl planted nursery beds the blight occurs in subcir patches that may be 2 feet or more in diameter where the plants are in fully separated lines, in st On older trees masses of branches on one side, o those within certain horizontal planes, are brow and if the trees have suffered from the diseas previous years the newly browned foliage is tiguous to branches that have already been or less completely defoliated or to branches on w the needles are withered and whitened. Leaves o ages are equally liable to attack. Diseased need white pine drop during the first summer, those and arborvitæ carry through the following wi and those of spruce commonly adhere throughout winter unless too much subjected to drought or or other disturbing agencies. An additional sym is the appearance in the fall of subepidermal like apothecia on needles browned the prece spring. These are exposed by the irregular dehisc of the overlying epidermis, and spores are discha from them in mild, damp weather until winter in. It has been noted also that black microscler occur almost constantly on the affected needles in spring. Just as the snow melts away a coverin white mycelia may be observed on the brow foliage.

Observation and experiment have established yond question that the disease is infectious and tagious and that it is due to a fungus. It se obvious that primary infection occurs in the fall, means of discharged ascospores. These germi readily without a resting period. It is certain a very important cause of infection is the myceli the browned needles. During the latter part of the ter, for a few weeks before the snow departs, this elium grows out under the snow onto adjacent age and enters dormant healthy needles.

n experiments in the control of this disease nursery have been sprayed with lime sulphur (dormant) arious strengths in the late spring and in the fall. ome cases the diseased plants were removed be- the beds were sprayed; but this proved to be o value. Spraying in the spring was likewise of ffect. On the other hand, spraying with lime sul- r in the late fall gave perfect control. After such ying not only did the disease cease to spread but e apparently dead plants revived to the extent unfolding meager new foliage in the following ng.

n order to control the blight on plantations, only tively healthy stocks are used and these are sprayed or dipped in lime sulphur. In some blished plantations the diseased stock was pulled hand and carried in sacks to canvas-lined wagons, oved, and burned. The full value of this measure not be fully appraised for another year or two. the fall of 1927 diseased branches were removed n a number of 6 or 8 year old trees and burned. e of these trees showed a little browning in the ing of 1928, but several came through clean. An eriment is projected in thorough fall spraying of ased trees in the plantations.

he cost of fall spraying in the nursery and of re- val of diseased plants from the plantation is ling.

t is a safe conclusion that Phacidium blight of ifers is native to America; under such circum- nces the sane procedure is not to employ embargo arantine except in the case of willfully neglected series, but to be ever on the alert and to adopt trol measures wherever the disease shows itself.

re Protection Along a Canadian Railway System

The Canadian National Railways, with lines trav- sing about 9,000 miles of forested land, report t fires originating in their operations destroyed y $34 worth of merchantable timber in 1927 and y $54 worth in 1928. In certain parts of this sys- n, notably in British Columbia, where timber values high and forest growth is extensive, oil burners used throughout the fire season. On the most zardous stretches special fire patrolmen are em- yed; in other parts of the system fire patrol is intained in connection with track inspection. enty-two fire-protection tanks are maintained in forested territory. Where heavy grades and side- ls exist timber adjacent to the right of way has n removed and firebreaks have been constructed.

Holland's Vocational Forestry School

A system of vocational training in forestry that has been practiced with success in Holland for 25 years is described by J. P. van Lonkhuyzen in a letter to the Journal of Forestry. Funds were appropriated by the State in order that a school offering such training might be established by the Dutch Society for the Reclamation of Waste Land (Nederlandsche Heidemaatschappij), of which Doctor van Lonkhuyzen is director. Entrance requirements are a common-school education, some agricultural education, and practical experience in agriculture. The minimum age for admission is 18. In each of the two years of the course a 5-month winter term is devoted to theoretical instruction in forestry, silviculture, surveying, levelling, etc.; during each of the two 7-month summer periods the students perform practical forestry work under the direction of officers of the society. This work includes soil cultivation, planting and sowing, thinning, draining, and reclamation.

For several years the society has been giving in different forest centers a short course in forestry designed for forest landowners and woods managers. Ten lessons are given dealing with methods of afforestation, forest management, characteristics and value of the principal forest trees, timber measuring and estimating, and forest enemies. The course concludes with an excursion to some forest estate.

Courses in tropical and European forestry leading to an engineer's certificate are given at the Agricultural University, Wageningen. Most of the graduates accept positions with the State forest service in Holland or in the East Indies, with societies, or with private forest proprietors.

Turkish Forest School

Mashar Bey, a Turkish forester, is authority for the statement that Turkey has had a forest school since 1855. This school was founded by a French forester, and until 1917 its curriculum was based on the programs of studies at the French forest school at Nancy. In 1917 the course was changed from two to three years and the school reorganized on the model of the German forest schools. Its faculty consists of 10 professors, of whom 4 conduct courses in forestry and 2 in engineering. There are about 60 students in the school at the present time.

The school is situated about 15 kilometers from Constantinople, at Bagce Köy. The school building is located at the center of the school forest of about 5,000 hectares. This forest is composed almost entirely of hardwood, the principal species being oak and beech.

Some Regulations for Privately Owned Forests in France

For as long as five months in each year French prefects may forbid landowners to make fires in their forests. With the consent of the Council of State certain forests may be classified by decree as being particularly exposed to fire, and owners of forests so classified may be compelled, if they do not do so voluntarily, to group themselves in fire-protection associations, acquire protection equipment, and organize fire-protection forces. Protection activities under this provision are controlled by the State and receive financial support from the State. The French forest protection law of 1924 further provides that railroad companies may clear a strip 20 meters wide on each side of their rights of way without the consent of the owners of the land.

On forest areas that have been burned over the prefects can ban grazing, even of the owners' stock, for a period of 10 years following the fire. Burned areas sown or planted may be exempted from taxation.

Private owners of forest land in France have the privilege not only of calling upon officers of the forest service for help in their forestry operations, but of entrusting the supervision and management of their forests temporarily to the forest service. Under the latter arrangement the owner decides upon the operation to be carried out and pays the State for the services rendered.

Before clearing forest land the French landowner must notify the prefectural authorities four months in advance. The Minister of Agriculture may interpose an objection to the proposed clearing if, with the advice of the Council of State, he finds it undesirable from the point of view of maintenance of soil on slopes, protection of soil from the action of water, protection of springs and streams, protection of the seacoast from the action of the sea and from drifting sand, national defense, or public health. An owner who clears forest land without giving notice or before the expiration of the required period, or in defiance of Governmental objection, is liable to severe penalties and may also be obliged to reforest the cleared land. Owners are not required to give notice of their intention to clear artificially established stands less than 20 years old, parks or gardens adjoining dwellings, or isolated woods covering less than 10 hectares and situated outside the mountain regions.

The application of this antideforestation law, remarks M. Passebois, principal inspector of waters and forests, permits action to prevent the diminution of the wooded area, but does not provide a means preventing impoverishment of stands. So long as wooded condition is preserved, the law does enable the Government to prevent abusive cutti This defect is partially compensated by provisions a law of 1922 that gives the Government control cuttings in certain forests classified as protec forests. This law applies to forests on which maintenance of the forest in its existing state considered necessary for the physical and mechan protection of the soil. In forests which on the vice of the Council of State are classified by dec as of this type the owners may not do any cutt without Government authorization, except cutting dead and down timber and of as much as 20 cu meters of living timber a year. Grazing, also, regulated. The owners of classified forests are titled to an indemnity corresponding to the reduct in revenue resulting from the classification, and this reduction amounts to half the normal reve from the forests they may demand that the land taken over by the State. In any case the State the right to expropriate forests classed as protec forests. Considerable resistance on the part owners has hindered the application of this law, Passebois observes, and the law has not been in fect long enough to permit an appraisal of its ef tiveness.

Anti-Deforestation Propaganda in Fra

French journals, notably L'Illustration and the letin de la Société Forestière de Franche-Comté, h recently been carrying appeals to the people o nation to interest themselves in checking the defo tion of France. It is stated that at the time of revolution of 1789 there were, according to g authority, from 15,000,000 to 16,000,000 hectares forests in France. At the present time only 10,330 hectares remains, of which 1,354,220 hectares is State forests, mostly standards, 2,150,465 hectare communal or institutional forests, largely coppice der standards, and 6,826,120 hectares in private c ership, of which a very large proportion is in sin coppice or coppice with standards of little va Since the war clearing and destructive logging h been reducing the area of forests at an alarming r A recent investigation by the forest service reve that in the past 10 years 200,000 hectares had b devastated by destructive logging. It has been mated that more than 5,000,000 cubic meters of w is now being removed from the forests yearly by proper methods of cutting. France faces the pros of an alarming shortage in timber supply and can end on making up the difference from its colonies, the reason that though there may be from 80,000,- to 90,000,000 hectares in the colonial French for- s most of the timber is too far from the coast or m transportation facilities and not more than ut 8,000,000 or 9,000,000 hectares is available.

t is estimated that there are in France about 00,000 hectares of idle lands, a great part of which ld be put into timber. The present rate of re- estation is about 11,000 hectares a year. In order bring the gravity of the situation before the people France a plan is under consideration for special ervances on Armistice Day.

alkies Featured by Canadian Forestry Association

The Canadian Forestry Association had 15 lecturers the field during the past summer and also pre- nted lectures through the medium of sound films. 'alkie" motion picture effects were provided in e railway lecture car which the association sent a tree-planting campaign through the Prairie Prov- ces and British Columbia and in a lecture "cara- n" presented to the association with complete equip- ent by John H. Price, president of Price Bros. and ., Quebec. The caravan toured Quebec and northern ew Brunswick, giving motion-picture programs in ylight as well as in the evening. Through the edium of the "talkies" it presented forest conser- tion lectures by Premier Taschereau; Hon. Honoré ercier, minister of lands and mines of Quebec; E. Beatty, president of the Canadian Pacific Rail- y; and Sir Henry Thornton, president of the Cana- ian National Railways.

At the end of July audiences reached this year by he association's lecturers totaled 179,148 persons.

orests of Yugoslavia Mostly in Public Ownership

According to L. Markovitch, forest inspector at elgrade, the forests of Yugoslavia have an area of ,586,026 hectares, including 546,443 hectares of de- uded land. Of the forested area 23 per cent is oc- upied by beech, 10.2 per cent by oaks, 55.6 per cent y mixed hardwoods, and the remainder by conifers. mong the softwoods are Scotch pine, spruce, fir, lack pine, and cypress. Nearly half the wooded area 47.7 per cent) is in public forests, 19 per cent is in ommunal and institutional forests, and 33.3 per cent s in private ownership. Mr. Markovitch estimates hat the production amounts to about 15,000,000 cubic eters a year. Exports of wood compose about 24 er cent of the total exports of the country.

Release Cuttings by Machinery

A woodland owner named Doré at Darmannes, Haute-Marne, France, is using successfully a machine of his own devising for cutting back the sprouts of hardwood in order to release planted spruce and fir and Scotch pine. Before the planting the hardwood is cut clear. The conifers are planted in straight lines spaced 2 meters apart. At the end of three years, during which time the hardwood sprouts have grown rapidly, the machine is drawn between these lines by a horse. The machine cuts off the sprouts at about 25 or 30 centimeters from the ground and clears a space 2 meters in width between the lines of planted conifers. Only a narrow strip of hardwood sprouts is left on the line and in the intervals between the planted conifers, just enough to provide a light shade for the conifers. Two men and a horse are required to operate the machine, which clears at least 3 hectares a day. The expense is estimated at less than 100 francs a hectare for the first cleaning; subsequent cleanings cost less. These costs are about one-fifth as much as the cost of doing the same work by means of hand labor. The machine consists of a frame, mounted on two large wheels, with a small motor mounted at the front, a movable section pivoted from the front and operated by a lever at the back, and in the rear two drums attached to the movable section. The two drums are clamped to a revolving shaft, one on each side of a pulley attached to the center of the shaft. Each drum consists of two wheels with the ends of 3 blades riveted to them, the cutting edge of the blades pointing to the rear. The shaft is attached to the movable frame, so that it can be set at the desired height or can be raised by the lever in order to pass obstacles. The shaft is turned by a belt driven by the small motor, which is of 8 horsepower. A detailed description of the machine with diagram is given in the June, 1929, number of the Bulletin de la Société Forestière de Franche Comté.

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It is reported by Bois et Resineux that Albert Nodon, president of the Astronomical Society of Bordeaux, has shown that the leaves of trees are the seat of radioelectric manifestations. This activity is greater in the flowering season and in sunlight. Because of this radioelectric activity of the leaves, radio waves passing over forests are deflected and radio antennæ in the forest have to be elevated to great heights to escape this influence.

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The Tharandt Forstliche Hochschule, Saxony, Germany, has united with the Technische Hochschule, Dresden.

Personals

Fred B. Merrill, formerly assistant State forester of Georgia, has taken office as State forester of Mississippi, succeeding R. L. Hogue. Mr. Merrill, a graduate of Cornell University, was for a time assistant State forester of North Carolina and later State forester of Kentucky. H. C. Mitchell will continue as assistant State forester of Mississippi.

S. H. Marsh has resigned as district inspector for Clarke-McNary work in the Southeastern States, to become vice president and general manager of the Ford Motor Co. at Staunton, Va. Mr. Marsh joined the United States Forest Service in 1911, the year of his graduation from the Yale School of Forestry. He was engaged for some years in the examination of forest lands for acquisition under the Weeks law, and when the Shenandoah National Forest was created became its supervisor. He was appointed Clarke-McNary inspector in 1927.

Charles F. Evans is filling the vacancy left by Mr. Marsh's resignation, by transfer from the post of district inspector for Clarke-McNary work in the Gulf States. Mr. Evans's headquarters will be at Asheville, N. C.

W. R. Hine has resigned as superintendent of forestry of Louisiana to accept the Clarke-McNary inspectorship in the Gulf States. Mr. Hine returns to the Federal service after four years in the State position. He was formerly a member of the staff of the Southern Forest Experiment Station.

Charles A. Gillett has been appointed extension forester of Arkansas, succeeding William K. Williams. Mr. Gillett was extension forester of North Dakota from 1925, the year of his graduation from Cornell with the bachelor's degree in forestry, until 1928, when he returned to Cornell for graduate study that led to the degree of M. F. In connection with his graduate work he served as assistant extension forester of New York.

Lyle F. Watts has returned to the United States Forest Service, from which he resigned in 1928 to take a position on the faculty of the forestry department of the Utah Agricultural College. He has been reinstated as senior silviculturist, Great Basin Experiment Station. Thornton G. Taylor, formerly with the United States Forest Service and until recently associate professor of forestry at the Idaho School of Forestry, succeeds to Mr. Watts's position at the Utah college.

David A. Kribs, a 1929 graduate of the Yale Forest School, has been awarded a National Research Fellowship and will spend a year in study at Bussey Institute, Harvard University.

Paul D. Kelleter has left the position of direc of extension, New York State College of Forest to accept that of administrative assistant to Federal Farm Board. Mr. Kelleter was a mem of the United States Forest Service from 1904 1923. For seven years of that period he was sup visor of the Black Hills National Forest, S. Dak. resigned from the service as forest inspector, bran of operation, to become director of purchase and sal of the Department of Agriculture.

W. E. White, who received the Ph. D. degree fr Yale University this year, is one of the men who ha recently joined the faculty of the reorganized Pe sylvania State Forest School. Doctor White receiv his bachelor's and master's degrees from the Univ sity of Vermont, and has served as assistant botan at the Vermont Agricultural Experiment Station. will teach botany at the Mont Alto plant of t Pennsylvania college. O. W. Pfleuger, a member the 1918 class of the Yale School of Forestry, com to Mont Alto as an instructor in forestry after spen ing nine and one-half years in the Philippines, whe he taught in the forest school and acted as direct of forest investigations. C. G. Geltz, who holds t M. F. degree from the University of California, ha taught two years at the New York State Rang School, and has had experience as a ranger on t Ouachita National Forest, will teach forestry Mont Alto. H. Norton Cope, formerly supervisor the Alabama National Forest, has resigned from t United States Forest Service, after being connec with it for 13 years, to become instructor in fores at Mont Alto. H. J. Lutz, who holds the M. F. degr from Yale and has had experience with the Unite States Forest Service and the Connecticut Agric tural Experiment Station, will serve as assistant pr fessor of forestry at State College. L. V. Kline, wh assisted in wood technology at the New York Sta College of Forestry while earning the M. F. degre will give instruction in that subject at State Colleg

C. H. Guise, assistant professor of forest manag ment, Cornell University, has been made assista director of the forest education inquiry which th Society of American Foresters is conducting under grant by the Carnegie Corporation and of whic Henry S. Graves is director. During the comin school year Professor Guise's work at Cornell will handled by Francis R. Righter, junior forester at th Southern Forest Experiment Station.

W. H. Horning, formerly a member of the sta of the Pennsylvania State Forest School, has bee appointed assistant professor of forestry at the Iow State College, succeeding Perkins Coville.

Clark C. Heritage, who for nearly two years has d charge of the pulp and paper section of the Forest oducts Laboratory, has resigned to assume the ectorship of a newly-organized development de- rtment for the Oxford Paper Co., Rumford, Me. will continue work on certain problems of the boratory in a consulting capacity.

Franklin W. Reed, who has been working under the de extension committee of the National Lumber nufacturers' Association as industrial forester, has en made forester of the association. E. T. Allen, of rtland, Oreg., who formerly held this title, has been ven the title of forestry consultant.

E. A. Ziegler, formerly director of the Pennsylvania ate Forest School, has joined the United States rest Service and has been placed in charge of a dy of the financial aspects of private forestry prac- e. This study is being begun in the South, with ctor Ziegler assigned to the staff of the Southern rest Experiment Station.

F. P. Keen, of the Palo Alto, Calif., forest insect boratory of the Bureau of Entomology, is being aced in charge of a new laboratory established by e bureau at Portland, Oreg. J. A. Beal, entomolo- st at the Appalachian Forest Experiment Station, being transferred to the new laboratory.

John C. Beebe has been appointed associated hydro- ectric engineer in the California National Forest istrict, succeeding E. W. Kramer, now district en- neer. Mr. Beebe has had long experience in irri- ation and power development and operation in the orthwest. Recently he has been employed in Cali- rnia by the Pacific Gas & Electric Co.

Charles M. Genaux, formerly assistant in forestry at the State College of Washington, has been appointed assistant professor of forestry at the Utah State Agricultural College and extension forester for Utah. Mr. Genaux is a graduate of the Pennsylvania State Forest School, and has received the master's degree in forestry from the University of Idaho.

J. E. Davis, who for some time has been engaged in forestry development in Chautauqua County, N. Y., as assistant county agent, is now assistant extension forester of New York in charge of junior forestry activities.

George A. Walker, a 1929 graduate of the Colorado Agricultural College, has accepted the research fellowship in the Iowa State College for the year 1929–30.

C. J. Telford has been appointed to the staff of the Forest Products Laboratory, Madison, Wis., and will take charge of the laboratory's small-sawmill study. Mr. Telford leaves the position of extension forester of Illinois. Previously he served for several years with the Natural History Survey of Illinois.

J. A. Newlin, who has charge of the timber mechanics section of the Forest Products Laboratory, has been appointed to membership on a newly organized committee on timber in the structural division of the American Society of Civil Engineers.

Officers elected this year by the Yale Forest School Alumni Association are Paul D. Kelleter, president; Marinus Westveld, vice president; and C. Edward Behre, secretary-treasurer. Members appointed to the executive council are C. Edward Behre, Joseph C. Kircher, and Allen M. Tucker.

Bibliography

What About the Year 2000?

By W. N. Sparhawk, United States Forest Service

In publishing the volume entitled "What About the Year 2000?"[1] the joint committee on bases of sound and policy, organized under the auspices of the Federated Societies on Planning and Parks, does not pre- end to be presenting the results of original research. This book, which was prepared under the committee's direction by George M. Peterson, is intended as a preliminary analysis, from a national point of view, of available data on land uses, and an attempt to forecast in a general way the principal surface uses of and in the United States by the year 2000. It discusses the extent and characteristics of our land resources; trends in population; requirements for urban, recreational, forest, and agricultural land; and the progress of planning in the field of land use. The conclusion is reached that with properly coordinated, systematic planning the United States need not worry over the doctrines of Malthus; in the year 2000 not only will there be abundant food for the expected population of nearly 200,000,000 but there will be plenty of land for cities, for recreation, and for forests.

In discussing forestry uses of land the author advances the view that "it is quite conceivable that forestry could be overexpanded just as agriculture has been," and raises the question "may it not be wise to keep some idle agricultural land in reserve?" Comparing the per capita consumption of wood in this country with the much lower consumption in Europe, he states that the latter "represents to some extent the amount of timber that will be consumed when trees are grown as a crop." This statement, of course, is based on an entirely erroneous conception of the reasons for low wood consumption in those portions of Europe that are responsible for the low average.

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[1] Mt. Pleasant Press, Harrisburg, Pa.

The book brings out very clearly the desirability of more exhaustive research and of much wider activity in the promotion of coordinated local, regional, and national plans for land use. Without such planning, it is doubtful that our increasing population will be able to maintain such high cultural standards and such high standards of living as we now enjoy.

A Comprehensive Text on Plant Ecology

By **Doris W. Hayes**, United States Forest Service

Plant Ecology,[1] by John E. Weaver and Frederic E. Clements, is a comprehensive textbook of botanical ecology that should prove equally interesting and useful to the teacher, the student, and the practical field worker. It is the outgrowth of many years of research and teaching by both authors, and comprehends the general course in ecology given by Doctor Weaver in the University of Nebraska. Repeated use by classes has proved the ready comprehensibility of the text and the workability of the experiments. The style of presentation is interesting and unpedantic. The volume contains in its 18 chapters 477 pages of discussion and 262 illustrations, and is completed by a bibliography of more than 600 entries, a table of contents, and an index.

The inclusion of Doctor Clements's system of classifying vegetational units, climax formations, and plant succession will prove of value to many who do not have access to his Plant Succession, now out of print.

The origin, development, and structure of vegetation and the methods of studying it are discussed and well illustrated. Ample consideration is given to the various factors of the habitat, such as soil, light, water, and wind, to the response of plants to each of these factors, and to the instruments for measuring them.

Chapters on plants and plant communities as indicators, competition and invasion, and relations between plants and animals contain much practical information of considerable economic value.

An especially valuable addition to the literature of ecology is the chapter Relation of Underground Plant Parts to Environment, which fills a long-felt need for accurate information concerning root habits and activities.

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A booklet telling how to identify the white pine blister rust and prevent its spread was published this season by the New York Conservation Department and provided on request to Boy Scout, Girl Scout, and other summer camps in the State. The booklet was prepared by Henry L. McIntyre, State supervisor of forest pest control.

Measuring Costs and Results in Ext
sion Work

By **C. E. Randall**, United States Forest Service

In such varied and roundabout ways does our cational work take effect that it is difficult to trac progress. When we fire a broadside of educati effort at some objective it would often be helpfu know which particular shot hit the bull's-eye; often the distinction is impossible.

Some light has been thrown on the relative effec ness of various educational methods by means study recently completed by H. J. Baker, directo extension, New Jersey, and M. C. Wilson, in ch of extension studies, Office of Cooperative Exten Work, United States Department of Agriculture. this study an effort was made to determine what fluences had led to the adoption of 30,183 impr farm and home practices on 9,872 farms in 14 Sta

The adoption of 44 per cent of the total numbe improved practices was credited to publicity meth including news stories, bulletins, circular lett posters, exhibits, general meetings, and radio ta The printed or written word proved strikingly e tive. News stories, bulletins, and circular let were credited with the adoption of the impr practice in 23.8 per cent of all the cases covered the study, the news story alone being credited v 12.8 per cent. The proportions of the 30,183 char in practice found to be attributable to indivic methods were as follows:

	Per
Method demonstrations and leader training	2
Result demonstrations	
Farm or home visits	1
General meetings	1
Bulletins	
Office calls	
News service	
Exhibits	
Correspondence	1
Extension schools	
Circular letters	
Telephone calls	
Study courses	
Radio	

On the basis of data furnished by 17 States, Mes Baker and Wilson present figures on the divisior these States' extension funds among the various m ods employed in extension teaching. The costlines several of the methods was found to be in stril contrast with their effectiveness. Method demons tions and leader training ranked about equally in two respects, since they consumed 19.65 per cent annual extension expenditures and caused 20.49 cent of the changes to improved practices. But re demonstrations, which consumed 17.22 per cent of outlay, accounted for only 8.06 per cent of the resu and exhibits, on which 4.2 per cent of the exten budget was expended, were credited with only 0.77 cent of the results; while news service, which re ed only 4.6 per cent of the expenditures, ac- ted for 12.82 per cent of the changes in practice. n the percentage of annual expense represented ach of the extension methods was divided into the entage of the changes in practice which that hod brought about, the following ratios were ved at:

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[1] McGraw-Hill Book Co. (Inc.), New York.

s service	2.79
lar letters	1.83
ral meetings	1.72
calls	1.56
etins	1.40
or home visits	1.13
er training and method demonstrations	1.04
lt demonstrations	.47
espondence	.45
phone calls	.44
nsion schools	.34
ibits	.18

lthough the study indicates that the printed word es much larger returns per unit of cost than any er extension method, the authors do not recom- d abandonment of any available method. It is by g a broadside that we are most apt to score a hit. authors point out that for different tasks differ- methods are the most effective, and also that even least effective method will enlarge the total of ension accomplishment if it occupies time not other- e profitably employed. It would seem wise, how- r, to place as much emphasis as circumstances mit on those methods that, in general, yield the gest returns upon money and time invested.

Trees for the Roadside

A timely book, much needed, entitled "Roadside evelopment," has just come from the pen of J. M. nnett, superintendent of parks and forestry, board county road commissioners, Wayne County, Mich. he author, who is a forester, devotes a large pro- rtion of the book to the use of trees. He has had perience in surveying, designing, and building roads, owever, and has evidently become well acquainted the ground with the other aspects of road develop- ent.

The material in the volume on the use of trees in adside development is comprehensive and practical. includes information on the species to plant, the ethods of obtaining and handling the stock, and the re of the trees after planting. The question of where nd how to use trees in the design of a highway is one into in detail, with attention to all such con- derations as the relation of the trees to pole lines at must parallel the highway, drainage, gas and ater mains, smoke, insects and diseases, roadway idths, and the soil and topography of the country rough which the highway passes. A résumé of what as been done and is now being planned in various tates in the way of roadside development is given, nd appendices contain the New York parkway law and laws of New Jersey and Maryland regarding roadside trees.

The most impressive thing about the book is the practical and usable character of the information it contains. It is full of the right kind of ammunition for the man who has a roadside development problem to attack and wants to begin at once.

New Handbook on Wood Construction Principles

A handbook on the properties of wood and its use for construction purposes has recently been published by the National Committee on Wood Utilization, United States Department of Commerce, under the title "Wood Construction." The author is Dudley F. Holtman, the committee's construction engineer. The committee's announcement states that the preparation of the volume was made possible through the cooperation of many leading authorities in the architectural, engineering, contracting, and building fields and in the lumber industry, in furnishing information concerning wood-construction practices and methods. Information was contributed also by the United States Forest Service and the National Lumber Manufacturers Association.

Early chapters of this volume discuss factors affecting the use of wood in construction, lumber grading, working stresses, and the properties, availability, and major uses of the principal woods employed in building and construction. A chapter on the identification of common woods includes keys. Other subjects discussed are the use of paints and stains, methods of protecting wood from fire, decay, and insect damage, and principles governing the different methods of framing wood, from light building construction to heavy industrial building and bridge construction. An appendix gives weights of various softwoods grown in the United States, grades of yard-lumber products cut from various species of softwoods, and the range of grades of softwood lumber used for specific purposes.

The book has 689 pages of text and many illustrations. Copies can be obtained through the National Committee on Wood Utilization, Department of Commerce, Washington, D. C.

* * *

The proceedings of the Eleventh Southern Forestry Congress, which was held at New Orleans, La., April 4 and 5, 1929, and a report of which was published in the Forest Worker of July, 1929, have been printed as a paper-bound volume of 183 pages. Copies may be obtained from the State foresters of the Southern States or from W. R. Hine, secretary of the congress. Mr. Hine may be addressed at the Stern Building, Baronne Street, New Orleans.

Strength of North American Woods

Handy reference tables showing the strength of the important commercial woods of the United States have just been published by the United States Forest Service. For 129 different species of woods the tables give an index of strength in bending, strength in compression parallel to grain and perpendicular to grain, stiffness, hardness, shock-resisting ability, and shearing strength parallel to grain. The weight per cubic foot, specific gravity (oven dry), and shrinkage from green to oven-dry condition also are given.

These tables were compiled by H. S. Betts, senior engineer, on the basis of approximately 130,000 tests made at the Forest Products Laboratory over a period of 15 years. They have been used by the Forest Service for some years. They are useful in comparing the properties of the different woods, in selecting woods for particular uses, and in establishing approximate working stresses.

Copies of the tables, which are published as Miscellaneous Publication 46-M, The Strength of North American Woods, can be procured free while the supply lasts from the Office of Information, United States Department of Agriculture, Washington, D. C.

Recent Books and Pamphlets

Ashe, W. W.: Profit or loss in cutting shortleaf and loblolly pines in Alabama. 64 pp. (Alabama State Commission of Forestry bulletin no. 2.) Montgomery, 1928.

Canadian Bureau of Statistics: Forestry in Canada. 30 pp. (Reprinted from the Canada Year Book, 1929.) Ottawa, 1929

Craib, I. J.: Some aspects of soil moisture in the forest. 62 pp. illus. (Yale Forest School bulletin no. 25.) New Haven, 1929.

Georgia State Board of Forestry: Second biennial report, 1927–28. 39 pp. illus. Atlanta, 1929.

Holtman, D. F.: Wood construction—principles, practice, details: A project of the National Committee on Wood Utilization. 711 pp. illus. McGraw-Hill Book Co., Inc., New York, 1929.

Kittredge, J., and Chittenden, A. K.: Oak forests of northern Michigan. 47 pp. illus., map. (Michigan Agricultural Experiment Station special bulletin no. 190.) East Lansing, 1929.

McIntyre, A. G.: Black locust in Pennsylvania. 20 pp. illus. (Pennsylvania Agricultural Experiment Station bulletin 236.) State College, 1929.

Miller, R. B., and Tehon, L. R.: The native and naturalized trees of Illinois. 339 pp. illus., maps. (Illinois Department of Registration and Education, Division of the Natural History Survey bulletin, vol. 18, art. 1.) Urbana, 1929.

North Carolina Department of Conservation and Development: Second biennial report for the biennium ending June 30, 1928. 105 pp. Raleigh, 1928.

Richardson, A. H.: Forest tree planting, rev. e pp. illus., map. (Ontario Department of Land Forests bulletin no. 1.) Toronto, 1928.

St. George, R. A., and Beal, J. A.: The southern beetle: A serious enemy of pines in the South pp. illus. (U. S. Department of Agriculture far bulletin 1586.) Washington, 1929.

Society of American Foresters: The forest educ inquiry: A preliminary statement of the obje and plan of procedure. 15 pp. New Haven, 19

Southern Forestry Congress: Proceedings of Eleventh Southern Forestry Congress. 183 pp. New Orleans, 1929.

Spaulding, P.: Decay of slash of northern white in southern New England. 20 pp. illus. (Department of Agriculture technical bulletin 132.) Washington, 1929.

Wackerman, A. E., and others: Yield of jack pi the Lake States. 23 pp. illus., map. (Wisc Agricultural Experiment Station research bul 90.) Madison, 1929.

Zon, R., and Averell, J. L.: Drainage of swamps forest growth. 22 pp. illus., maps. (Wisc Agricultural Experiment Station research bul 89.) Madison, 1929.

Articles in Periodicals

Cross Tie Bulletin, July, 1929.—Cross tie requiren of electric railways, by H. H. George, pp. 1–12.

Forstwissenschaftliches Centralblatt, July 15, 19 Die entwicklung holzverkohlender betriebe, by I von Bonin, pp. 509–521.

Journal of Forestry, April, 1929.—Forest manage incentive to private operators, by E. T. F. Wol berg, pp. 333–346; Forest conservation in Ont by R. S. Kellogg, pp. 429–431.

Journal of the American Society of Agronomy, J 1929.—Range research of the United States F Service, by W. R. Chapline, pp. 644–649.

Paper Trade Journal, May 23, 1929.—Review of c lose chemistry developments, by J. L. Parsons 73–74; Survey of chemistry of lignin, by E. H pp. 75–78.

Quarterly Journal of Forestry, July, 1929.—The h rot of timber in relation to forest management W. R. Day, pp. 242–251.

Schweizerische Zeitschrift für Forstwesen, J 1929.—Einfluss des waldes auf den wasserab bei landregen, by H. Burger, pp. 196–199.

Southern Lumberman, July 15, 1929.—Determi the timber-yielding capacity of southern pine s by E. L. Demmon, pp. 53–54.

Timberman, July, 1929.—Factors affecting cost tractor logging in California pine, by M. E. Krue pp. 65–67, 70, 74.

Recent Publications of the Forest Serv

Department Bulletins: 1497, Forest Planting in Lake States; 1499, Timber Growing and Cut Practice in the Lodgepole Pine Region; 1500, Gluing of Wood.

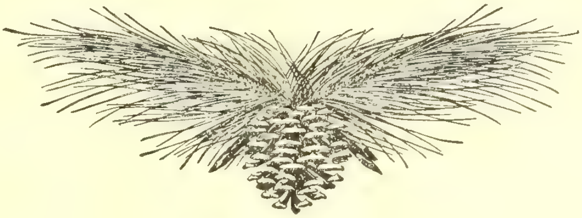
National Forest Map Folders: Gila, Coconino.

National Forest Administrative Maps: ¼-inch, H boldt; 1-inch (3-color, contour), Shasta.

National Forest Proclamation Diagrams (changing terforest boundaries): Uinta, Medicine Bow.

U. S. GOVERNMENT PRINTING OFFICE:

FOREST WORKER



November, 1929

Issued bimonthly by the FOREST SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

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Announcements

Virginia Commercial Forestry Conference

A Virginia Commercial Forestry Conference will be held February 11 and 12 in Richmond, Va., at the John Marshall Hotel. Arrangements for the conference are being made by the Virginia State Chamber of Commerce and a general committee including State Forester Chapin Jones, W. duB. Brookings, in charge of the conservation division of the United States Chamber of Commerce, and representatives of the lumber and wood-using industries, recreational interests, and women's clubs.

National Research Fellowships in Agriculture and Forestry Available

The National Research Council announces the availability of national research fellowships in the biological sciences, including agriculture and forestry. These fellowships, supported by the Rockefeller Foundation, are for study and research in America or abroad, and are open to citizens of both sexes of the United States and Canada who have the Ph. D. degree or its equivalent. They are intended primarily for comparatively recent graduates and not for those already profes ally established. The basic annual stipends are $ for unmarried fellows and $2,300 for married fe in America and $1,440 and $2,400, respectively, travel allowance in addition, for fellows appointe study in Europe. Awards are made for one year fellowships may be renewed. Fellows for 1930–31 be chosen at two meetings of a board appointe the National Research Council. Applications file fore January 1 will be considered at a meeting the first week in February. To be considered a second meeting, applications must be filed b April 1.

The choice of the institution in which he shall is made by the fellow, subject to the approval o fellowship board. The appointments are for full and no other remunerative or routine work is mitted.

Inquiries in regard to the fellowships shoul addressed to the chairman, Board of National Rese Fellowships in the Biological Sciences, National search Council, Washington, D. C., or to Dr. A Woods, Director of Scientific Work, Departmen Agriculture, Washington, D. C.

The Forest Worker is published by the Forest Service, United States Department of Agricultur Washington, D. C. Jean Kerr, editor. Material offered for publication in the Forest Worker shoul be addressed to the editor.

Because the free edition is necessarily limited, this periodical can be distributed without charg outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestr associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for single copy or 25 cents for a year's subscription to the Superintendent of Documents, Governmen Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

FOREST WORKER

shington, D. C. NOVEMBER, 1929 Vol. 5, No. 6

State Forestry

w York State Forests for Timber Production

he fall of 1929 has seen New York make a vigorous nning in the development of productive State sts. Something like 1,750,000 trees were planted ctober on lands acquired by the State in Cortland, nango, and Otsego Counties under the provisions he Hewitt reforestation law, which authorizes the blishment of State forests for timber production. months after the Hewitt law was enacted in the ng of 1929 the State had acquired more than 6,000 s of land under this authority. The conservation missioner intends to plant 20,000 acres of productive State forests in 1930, if it is possible to prove to that much land in time. In preparation for planting two new forest nurseries have been laid n in the State's southern tier of counties.

1 1929 New York planted 9,135,000 trees on State-ed land, using 2,000,000 of these to reforest game ges.

lassachusetts Inventory of Forests

otential forest area makes up 62 per cent of the l area of Massachusetts, the State department of servation recently announced on the basis of a town-town survey. The classification "potential forest a" includes with present forest area abandoned ds and pastures that are coming up to brush and ttered tree growth. On 80 per cent of the forest a the stands are in general under 35 years of age. e northern white pine stands and mixed stands in ich northern white pine clearly predominates con-ute 22 per cent of the forests in the State, with a tively good percentage in the upper size classes. mlock is found in small patches in nearly all the nties except Plymouth and Barnstable, but spruce onfined to the higher elevations of the Berkshire ls. The gray birch and red maple type covers 20 cent of the forest area.

This inventory of Massachusetts forests was begun 14 rs ago. Field work has been continued each sum-r since then by a crew of two or three forestry stu-ts working under the direction of a representative the State forestry organization. In the main the towns were cruised in strips 1 mile apart, run either north-south or east-west so as to cut the topography.

The expense of the survey was about $1,000 per county.

First Florida Forest Fair Held at Lake City

The heavens smiled on the first Florida forest fair, held at Lake City November 13–15, and something like 4,000 visitors turned out to see and hear what the State forest service and kindred organizations are doing. Exhibits contributed from many sources and arranged in Lake City Hall included fire protection and turpentining tools and equipment; a display of forest products; a relief map of the West Bay protective unit showing firebreaks, the locations of the district forester and fire wardens, a miniature lookout tower, and other features of the protection plan; and a chart showing in summary form the fire record for the first year of protection, including all costs. Those viewing the exhibits included many children, who through arrangement of school authorities were brought by classes from the local schools. Twenty-five automobile loads of visitors, principally turpentining operators, lumbermen, and owners of forest land, following a carefully arranged schedule, traveled to the State forest nursery at Raiford, to the experimental naval stores operations of the United States Forest Service at Starke, to a fire tower operated by the Florida Forest Service, and to a pine forest where Austin Cary, of the United States Forest Service, gave a thinning demonstration. Firebreak construction, the raising of pines in nursery beds, forest-tree planting, and improved methods of turpentining were explained as the tools and the results were displayed. At night sessions in the Lake City courthouse I. F. Eldredge discussed forest management and Assistant State Forester Wilson spoke on "new uses for old wood and new possibilities for Florida." The jazz element was supplied by a new lecture truck of the Florida Forest Service, which is equipped to show motion pictures and to accompany them with music. A novel feature of this truck is the fact that the exhibits it carries, including a number of "scenes-in-action," are so arranged as to be brought to view simply by raising the sides of the truck.

More Progress in Wisconsin Forestry Legislation

The Wisconsin Legislature has followed out with great fidelity the recommendations laid before it in the spring of 1929 by its interim committee on forestry and public lands. Among the resulting laws and revisions of laws special significance attaches to those dealing with county forestry, because of the fact that in Wisconsin tax delinquent lands revert to the county. Wisconsin law now provides that the county board of any county may by resolution acquire land, by tax deed or otherwise, for the purpose of establishing a county forest reserve. (Such a resolution may or may not be submitted to the voters for approval, according to whether the voters petition a referendum.) County-owned lands may be registered under the forest crop taxation law, without payment by the county of the "acreage share" of 10 cents per acre that is levied annually on privately-owned lands so registered. Counties taking tax deeds need not pay delinquent taxes (excess delinquency), the redemption value of outstanding tax certificates, or interest or charges until they sell the land or, if it is entered under the forest crop land taxation law, until the forest crop is harvested. Insufficiency of the sum realized to pay all such claims will not result in further liability of the county. County boards are authorized to block out county-owned forest lands by exchange. An amendment of the county zoning law empowers the counties to set aside for forest and recreation purposes lands that are more suitable for those purposes than for agriculture.

The conservation commission is authorized to block out State forest areas either by selling isolated tracts or the timber on them or by exchanging any State-owned forest lands for other lands, in either public or private ownership, that are adapted to forestry purposes. Receipts from such sales are appropriated for purchasing additional State forest lands or for improving or developing State forest lands.

Any city, village, town, or school district of the State may now acquire and manage lands for forestry purposes, either within or without its territorial limits.

The forest crop land taxation law as revised at this session sets 40 acres as the minimum size for land areas, other than farm wood lots, that may be registered under its provisions. (The law sets no minimum acreage for wood lots; the previous minimum acreage for other land areas was 160.) It provides that 50 per cent of all moneys received by any town on account of forest crop lands within the town shall be apportioned to the various school districts in which the forest crop lands are located; that owners may cut fuel wood for their own use from registered lands without giving notice; and that registered forest crop lands on which the "acreage share" is delinquent for more than three years, or lands on which the amounts due the State because of withdrawal from registra are delinquent for that length of time, shall bec the property of the county. The limitation prev ing the entry of lands bearing merchantable timb removed. The State conservation commission authorized to employ a fire warden to have charg fire prevention on forest crop lands, and the scal appropriations to the commission for carrying out provisions of the law is raised to the following: Fi year 1931 (beginning July 1, 1930), $70,000; 1 $100,000; 1933, $120,000; 1934, $125,000; 1 $130,000; 1936 and thereafter, $150,000.

For the first time since the constitutional am ment of 1924, a direct tax was authorized for support of State forestry activities. It was set one-twentieth of a mill.

The State income tax law was amended to a deduction from taxable income of amounts expen in establishing, caring for, and protecting forest c on lands registered under the forest crop land t tion law.

In the act enabling the United States Governm to acquire land in Wisconsin for national forest poses, the maximum to be acquired for these purp was raised from 500,000 to 1,000,000 acres.

The legislature's interim committee on forestr continued, with Senator George W. Blanchard a acting as chairman.

Fire Report on Southern Mississipp Protection Area

On the Pascagoula Forest Protective Area, in sou ern Mississippi, 89 per cent of the 560,000 acres of l under protection was kept free from fire in the y ending June 30, 1929, District Forester Kimball ports. During the year 502 fires occurred on the a of which 83 per cent were incendiary. The aver fire burned over 126 acres. A new lookout tower recently been added to the four previously erected the area. The telephone system now includes miles of line, with 83 boxes.

A new forest protection area of 100,000 acres kn as the Wolf River Area is being organized in Hanc County, Miss.

New Protection District in West Virgi

West Virginia's forest fire protection system been extended to a fifth district consisting of counties of Berkeley, Jefferson, Morgan, Mine Hampshire, Hardy, Grant, and Pendleton. The forest district has been christened Potomac and been placed under the charge of Mr. C. G. Hamil as district forester. Mr. Hamilton formerly served district game protector for approximately the sa territory. During the past summer three new towers were added to the one already in use in district.

e Empire State Forest Products Association Carries On

eeting at Albany, N. Y., on October 11, 1929, the pire State Forest Products Association reviewed a 's cooperation with the New York State Forestry ociation in work such as fire-prevention publicity campaign activities in support of the proposed e constitutional amendment to make an emergency l available for forest-fire fighting. As its contribu- to the observance of conservation week in the ng of 1929 the association prepared and distributed re-prevention poster presenting in pictures and in istics the story of how New York's forest fires inate. During the year, also, the association per- ed affiliation with the New York Conservation ociation, one result being that the latter body now otes a page of its Conservationist to the interests of forest products association.

n looking ahead to the new year's work, Secretary B. Recknagel expressed the feeling that the Empire e Forest Products Association has an opportunity oe of particular service to secondary wood-using istries at present not adequately represented in association, either of manufacturers, wholesalers, etailers, and stated his purpose to enlist such indus- s as associate members. For 1930 the association's get again provides for prize awards to 4-H forestry members. These are to total $35.

lections for 1930 resulted in the continuance of the sting board of directors, headed by George N. rander, and of the following officers: President, orge W. Sisson, jr.; vice president, John N. Carlisle; retary, A. B. Recknagel; and treasurer, W. Clyde kes.

anagement Plan Followed by Pennsylvania Boy Scouts

When Boy Scouts of Scranton, Pa., are in camp they their firewood according to a forest-management n drawn up for them by Herbert M. Nicholas, trict forester of the Lackawanna forest district of nnsylvania. The scouts' camp ground includes 441 es of land on Goose Pond, in southern Wayne unty, that is part of an auxiliary State game refuge. e management plan is designed to bring about a stained yield of timber on the tract, to encourage growth of the more desirable tree species, and to velop a favorable habitat for Boy Scouts, fish, and me. The recreational purpose saves the lives of ny gray birches that ornament the margin of the e; in general the scheme is to exclude the aspen-gray ch type in favor of the hemlock-northern white e and beech-birch-maple types.

A 20 per cent strip survey of the area showed that average acre had a timber stand of 1,953 cubic feet d an annual production of 73.35 cubic feet. For the esent Mr. Nicholas has set the annual cut for the area at 5,000 cubic feet. For some years to come the cut will be mostly of inferior species and thus will be valuable only as fuel wood. All tops of cut trees are to be lopped and scattered to reduce fire hazard, and old roads and trails are to be kept open and in good condition. Two hundred thousand trees have been planted in open fields, and Norway spruce and Norway pine transplants are being grown for planting on areas from which pure stands of gray birch and aspen are to be cut. The scouts are doing the greater part of the cutting and planting, under the supervision of their camp forestry instructor. For further practice in the handling of the ax they are to prune dead side limbs from favored trees.

Record Tree Distribution in Ohio

The Ohio Forestry Department shipped 3,251,345 trees from the State forest nurseries in the spring of 1929, breaking its previous record by a quarter million. Of this total 1,512,981 were distributed to 577 farmers, 835,625 to 15 cities, and 175,100 to 14 mining companies, and 636,109 were planted on State parks and State forests.

According to the department's plans it will take only a few more years to complete the reforestation of nonwooded areas on the 32,354 acres of land now contained in Ohio State forests.

Harvest From Vermont State Forests

Forest products harvested last winter from the Vermont State forests included 403,806 board feet of timber and 103 cords of wood. The State forest service reports the cutting of 266,435 board feet of spruce, fir, and hardwoods on the Groton State Forest, Peacham, 124,571 board feet of spruce and fir on the L. R. Jones State Forest, Plainfield, and 12,800 board feet of white birch on the Proctor Piper State Forest, Proctorsville.

Big Longleaf Seed Crop in Alabama

Longleaf pines bore a large crop of seed in Alabama in 1929, the State commission of forestry reports. Even on young trees cones have been especially abundant; in Monroe County more than 2 bushels of cones, containing some 9,000 seeds, were collected from one small tree 9 inches in diameter at breast height. The State forester planned to have 1,200 bushels of longleaf cones sent to the State forest nursery, where the seed extracted from them would be used in producing planting stock for distribution in the fall of 1930. At the end of October 627 bushels of cones had been sent to the nursery.

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The Michigan Conservation Commission recently authorized purchase of an additional 476 acres in the Hardwood State Forest and of an additional 1,575 acres in the Au Sable State Forest.

Education and Extension

Forestry Chair Established at University of Arkansas

The University of Arkansas has established a professorship of forestry and has filled the new position by appointing R. P. Holdsworth. Mr. Holdsworth is a member of the 1928 class of the Yale School of Forestry who spent the past year in Sweden as a Scandinavian-American scholar. For some years the university has offered a course in the principles of forestry, under Professor Cooper. Professor Holdsworth is instructing upperclassmen in fundamentals of silviculture, and in the latter part of the school year will direct them in practical silvicultural work, including seeding and planting. Later it is proposed to make a course in general forestry available to underclassmen. A course for teachers in the agricultural high schools of the State will perhaps be offered during the summer term. In due time Professor Holdsworth hopes to undertake a program of research, including studies of the many important hardwood types found in Arkansas. In developing its forestry work the university will give special attention to farm forest problems, as might be expected in a State where farmers own nearly 8,000,000 acres of woodland.

Arkansas Polytechnic College Allots Land for National Forest Nursery

The Arkansas Polytechnic College, in Russellville, Ark., has given the United States Forest Service the privilege of establishing a forest nursery on an acre of the college farm. The nursery will be a convenient source of supply of stock for planting on the Ozark National Forest. This cooperation was readily offered by the president and board of the college when it became known that forest officers were having difficulty in finding a site suitable for a nursery on the forest itself.

Forestry in West Virginia Vocational Training

Forestry made its West Virginia debut as a feature of high-school vocational training in agriculture in the spring of 1929, writes Extension Forester Thomas W. Skuce. Boys of the Wadestown, Monongalia County, High School prepared nursery beds and lined out 2,000 Norway and Scotch pine seedlings obtained through Mr. Skuce. Shade frames for use in the nursery were constructed by the boys in the school's manual-training shop. After two years in the transplant rows the trees will be planted in old fields near the school.

Gift to College of Forestry, Universit Washington

The College of Forestry, University of Wasl ton, has received a gift of $50,000 from Mrs. Agne Anderson. Most of the income from the fund is t used for graduate research fellowships; the remai will be available for loans. Mrs. Anderson, w father and husband were both connected with lumber industry in the Northwest, has long interested in the forestry work of the university. 1924 she gave $250,000 to build and equip Ande Hall, the university's second forestry building, memorial to her husband, Alfred H. Anderson.

Cornell Puts Forestry on the Air

Forestry is going on the air about once a week winter from the Cornell University Radio Stat WEAI. In the months of September–December, clusive, seven members of the Cornell forestry fac were scheduled to give 15 noontime radio talks. interest and variety of the fare thus laid before radio audience is suggested by the program of talk follows:

SEPTEMBER

The Adirondack Tour	J. A. Cope.
4–H Forestry Program, New York State	J. E. Davis.

OCTOBER

Forest Fires and Forest Hunters	R. S. Hosmer
Home-Grown Heat	J. A. Cope.
Amendment No. 4	R. S. Hosmer

NOVEMBER

Measuring the Wood Lot Crop	J. Bentley, jr
4–H Forestry Field Days	J. E. Davis.
Cornell Wood Lots	S. N. Spring.
Cornell's 2,000-Acre Forest	J. N. Spaeth.
Hardwoods versus Softwoods: Timber Growing in the North and South	F. I. Righter.
Crop Trees of New York State	J. A. Cope.

DECEMBER

Working a 4–H Wood Lot	J. E. Davis.
How Cutting has Improved the Cornell Wood Lots	S. N. Spring.
Christmas Trees	R. S. Hosmer.
Marketing Forest Products	J. Bentley, jr.

⁂

Cornell University has enrolled 95 undergradu and 5 graduate students in its professional fores course this term.

–H Club Boys Join in Adirondack Forestry Tour

ve New York State boys participated in the ondack forestry tour arranged by the New York ervation Department and farm bureaus in ember, 1929, joining with 75 men in a 4-day field of private and State reforestation projects. As 28, the Empire State Forest Products Association the expenses of the tour for the boy who won first in second-year 4–H forestry club work. The other boys were sent by fish and game clubs of pkins and Orange Counties in recognition of llence in first-year forestry club work.

the four years since 4–H forestry club work was n in New York enrollment in the clubs has grown ore than 1,000. In 1929 not only have new installts of club members been busy with the first-year in forest planting and the second-year work in est appreciation" (which includes making a ction of leaves, twigs, and fruit of 15 local trees), a number of third-year workers have undertaken ects in woodland improvement. The complete of work developed for the clubs includes a fourth , in log scaling and timber estimating.

Since August 1, 1929, junior forestry extension activities in New York have been directed by J. E. Davis, who was formerly extension forester for Chautauqua County and is now assistant extension forester for the State.

Jefferson Forest Research Fund

A fund to be used for forest research has been established by an anonymous donor as a memorial to Thomas Jefferson. Alfred Akerman, professor of forestry at the University of Virginia, is to direct the research thus provided for. The donor has suggested that Georgia be made the field of research for the present, and as two subjects of inquiry has suggested (1) the effect of multiple taxation on cutting of immature timber crops and (2) the trend of State and Federal forestal activities in their relation to the Jeffersonian principles of a large measure of freedom for the individual, local self-government, and limited Federal Government. Professor Akerman invites suggestions as to subjects to be chosen for inquiry, methods to be used in making inquiries, and the publication of findings.

Forest Service Notes

dget Bureau Recommends $2,419,000 ncreases in Forest Service Appropriations

'unds available for protecting the national forests n fire will be larger by $2,019,500 in the fiscal year 1 than in the current year, if Congress follows the ice of the Bureau of the Budget. The bureau is mmending an increase of $188,500 in the appropria to the Forest Service for prevention of forest fires, ncrease of $331,000 for protection improvements on national forests (including $25,000 specifically alted to the national forests in southern California), an increase of $1,500,000 for protection roads trails. Further increases recommended for naal-forest protection are $25,000 for combating inous insects and an equal amount for blister-rust trol.

lesearch funds of the Forest Service will be increased $238,000 if the Budget Bureau's recommendations accepted. The proposed increases included in this ount are $60,000 for forest-management research, ,000 for range investigations, $50,000 for forest ducts investigations, $85,000 for a survey of forest ources and requirements, and $25,000 for studies in est economics.

'or Federal cooperation with the States in forest protection an increase of $300,000 is recommended, for cooperative distribution of planting stock one 10,000.

An increase of $15,000 is recommended for planting on the national forests, and one of the same amount for range improvements.

The sum of all recommended increases to the Forest Service is $2,419,450.

National Forest Reservation Commission Approves 10-Year Program

Meeting on November 2, the National Forest Reservation Commission approved Federal acquisition of 85,195 acres of land for national-forest purposes. This purchase program covers 11 areas located in the three Lake States and in five Eastern States. The largest areas approved for purchase are located within the Catahoula unit in Louisiana, the Mackinac unit in Michigan, and the Moquah unit in Wisconsin. The average price of the land involved is $2.69 per acre and the total obligation is $229,406.82.

At this meeting the commission had before it the matter of proposing to Congress a program and policy for the purchase of lands for national forests in the 10-year period following June 30, 1931, when the Woodruff-McNary Act expires. It agreed to transmit to Congress a program for the purchase of 9,400,000 acres of land for national-forest purposes, and to recommend that Congress adopt a policy of appropriating $5,000,000 per year for such purchases for the 10-year period beginning July 1, 1931. This program would apply only to lands lying east of the ninety-fifth meridian.

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Heptane from California Pine Trees

By C. L. HILL, United States Forest Service

Two kinds of pine trees, both confined largely or entirely to California, have prospects of a step-up in the economic scale because of a hitherto unexploited product of their resin. The product is heptane. One of the trees is the valuable timber species Jeffrey pine, or apple pine as the mountain people call it because of the odor of apple or pineapple that is usually emitted by its bark. This tree is found in the higher mountains almost throughout the length of California. The second is the Digger pine, which in the past has figured as a species of little value because its principal use was for fuel wood. The straggling form and thin gray foliage of this tree are a familiar sight along the foothills and lower levels of both the Sierras and the Coast Range. Development of a market for its resin would be welcome news to ranchers in the foothill regions of California.

The resin of these two trees was early discovered to have curative value as an application for cuts and wounds. During the Civil War agents of the Union Armies, which were cut off from southern supplies of naval stores, reached far-away California in the search for such products. They tapped Jeffrey pine and distilled its resin for its healing principle, which they called abietene. Throughout the war healing salves for man and beast were made on the basis of abietene. Since then, what with the rapid development of synthetic and more highly derivative drugs, abietene has faded into the background together with the herb and root "simples" of our grandmothers' medicine chests.

Some 20 years after the Civil War ended, chemists at the University of California discovered that the liquid obtained by distilling the resin of the Jeffrey and Digger pines was in reality a hydrocarbon which the chemists call normal heptane. The publication of this fact caused a veritable uproar in the chemical world; for this heptane, a hydrocarbon commonly found in petroleum, is of a quite different nature from the terpenes which form turpentine and which were supposed to be produced by distilling the resin of any well-regulated pine tree. In fact, no other growing plant of any kind had till then been found to yield a direct or primary product of such nature. Other chemists refused to believe the findings of the California men. One German chemist derisively suggested that the California chemists had washed their glassware with some petroleum product and had failed to clean off the cleaner. The battle waged for many years before the findings of the California chemists were generally accepted among the chemical profession.

Even then the production of heptane from pine remained only a chemical curiosity. To be sure, heptane would form a valuable chemical reagent for laboratory use, especially in schools and colleges, being suited better than almost any other for the illustration to stu
of many important reactions. And heptane proc
from these pine trees has a great advantage over
obtained from petroleum in the ease and cheapn
its recovery. The initial distillation of oleoresin
these pines produces normal heptane about 96 pe
pure; and the substances composing the remain
per cent of the distilled product have boiling p
so far from that of heptane that complete rectific
of the latter is comparatively easy. In petroleu
the other hand, heptane is mixed with many
hydrocarbons having boiling points so near its own
isolation of the heptane is very difficult. Thus
tane can be produced from these pine trees at a
much lower cost than from petroleum. Even
has seemed that an established industrial use, su
would sustain a steady producing operation,
have to be found before the general and laboratory
of heptane could be developed.

Such an industrial use now appears to be a possib
In connection with octane, the hydrocarbon next
in the same chemical series, heptane can be use
the laboratory measurement of the knock of diff
gasolines, and therefore of the dosage of tetra-ethyl
that is necessary to neutralize that knock. Ex
ments are now in progress to perfect this meth
measuring gasoline knock.

Experimental work on methods of tapping Je
and Digger pines has recently been carried out b
California Forest Experiment Station. The appr
method is similar to that used in the turpentine w
of the Southern States. The chipping must be
with considerable regularity; in general, how
ranchmen chipping their Digger pines could make
work a means of utilizing spare time.

Breakage in Selective Cuttings in U Michigan

A count recently made by the Lake States F
Experiment Station of trees broken as a resu
selective cutting operations in the Upper Peninsu
Michigan showed that the cutting, ranging from
to heavy, resulted in breakage of only 2.1 per cent
number of trees above 2½ inches in diameter i
original stand. The operations covered 46 acr
forest at the station's northern hardwoods field
tion. On one 8-acre plot a heavy selective cu
resulted in the breaking of only 28 trees, of whi
were less than 8 inches in diameter. On the
hand, in very heavy cuttings in which 92 per ce
the total volume was removed the breakage amou
to 26 per cent of the total number of trees i
original stand. The figures given are for trees b
so completely that they had to be cut; no count
made of other trees damaged by the breaking of
or branches or the scarring of boles.

Foolproof Method of Planting Longleaf Pine Seedlings

By Philip C. Wakeley, United States Forest Service

Solution of a difficult problem confronting all nters of longleaf pine has contributed to the success the Great Southern Lumber Co., Bogalusa, La., in aining remarkably high survival in plantations of s species. As was reported in the Forest Worker July, 1929, on some areas planted by this comny in 1928–29 longleaf pine survival was as high as per cent.

Longleaf pine seedlings are usually ready for plant- when 10 or 12 months old. At this age they are ctically stemless. When the stemless seedlings are out, whether they are planted in the dibble hole a cleared spot or plowed furrow or are planted with nattock, it is vitally important to set them half inch higher in the ground than they grew in the sery. If this is not done the surface soil "silts in" on the buds, killing many of the trees within the t year or two after planting and seriously delaying growth of many more. The necessary "setting " of the seedlings has been attained with relative e by experienced workers putting in experimental demonstration plantations. On large commercial operations, however, where speed is at a premium and planters are sometimes insufficiently skilled, many trees have been set too high or too low in the ground, and accordingly have died.

Red Bateman, head ranger of the Great Southern Lumber Co., found that in the commercial operations the trouble lay in the way in which the planter grasped the seedling. In taking the seedling out of the planting bucket and putting it into the dibble hole the workman picked it up by the needles and set it at a depth gauged only by eye. Bateman's correction of the trouble was simplicity itself. He required his men to pick up the seedling between fore and middle finger, with the backs of the fingers downward and with one finger on each side of the taproot just under the root collar. The thumb and last two fingers held the needles, which lay along the wrist and lower forearm. When the planter inserted the root in the dibble hole the backs of his fore and middle fingers rested on the ground, and instead of the depth of setting being gauged by eye the root collar was automatically kept above the surface by a distance equal to the thickness of the fingers. In this way vastly more uniform and successful planting was done with absolutely no loss in speed.

One of the advantages of this improved method lies in the ease with which crew foremen can enforce its use.

General Forest News

The Brown Pine Scale in Nebraska

By F. R. Johnson, United States Forest Service

During the past year those responsible for forest tection in Nebraska have come to realize that iferous plantations in the State are seriously eatened by Toumevella pini, the Brown pine scale. Toumevella pini is a soft-shelled scale, globular hape and black and reddish in color. It works on newer shoots. The attacked trees take on a racteristic sooty appearance. Unless controlled scale quickly increases to such a degree that the sted trees die. This insect was first reported to Bureau of Entomology from Nebraska in 1916, en it was found on a windbreak planting on the ch of F. G. Beckhoff in Thomas County, about 15 es northwest of the Nebraska National Forest ntations. In this case the infested trees were ayed with oil by the Forest Service; the oil spray found ineffective, and later the trees were cut out. 1923 an infestation was reported in Holt County, a large jack-pine windbreak on the ranch of R. O. ford. At this place the infestation was so severe t many trees were killed. Later the owner par- y controlled the pest by cutting out the infested s and branches. In the spring of 1928 an infestation of several acres was discovered in a jack-pine plantation on the Nebraska National Forest. Here the infested trees, which were of considerable size, were cut out and the branches burned. A smaller infestation in the Nebraska Forest plantations was discovered and controlled in the fall of 1928.

In the spring of 1929 a survey made by the State authorities in southern Holt County, which contains more coniferous plantations than any other portion of the State, showed that 12 wood lots out of the 35 examined were infested. Four infestations were discovered, also, in Thomas County, within 10 or 15 miles of the extensive Nebraska Forest plantations. A conference was held by Governor Weaver, State Secretary of Agriculture McLaughlin, State Nursery Inspector Gates, Extension Forester Watkins, and F. R. Johnson, of the United States Forest Service. The governor was in favor of going ahead with control work. The State department of agriculture has police authority to require landowners to clean up insect infestations, but because so little is known about the control of this scale it seemed desirable for the department to take the lead in trying out control methods. Accordingly the department purchased a power sprayer, and borrowed a truck from the forest, fish, and game commission. The California Spray Chemical

Co. donated 130 gallons of volck. The nursery inspector and the extension forester had charge of the spraying. A number of insecticides were used with results that will be checked later. Apparently a 2 per cent solution of volck controls the scale satisfactorily. It appears now that the success of the spraying depends upon getting the young shortly after they hatch and before they attach themselves permanently to the limbs of the trees. It was decided to carry out further experimental spraying in the fall when the trees and the scale were dormant. Within another year it should be possible to determine the proper season for spraying and the best spray to use.

Two distinct centers of infestation have been discovered. The larger is in the southern part of Holt County, about 80 or 90 miles east of the Nebraska Forest plantations. A smaller infestation is located in Thomas County, 10 to 15 miles from the Nebraska Forest plantations. Evidently, infestation with this scale in Nebraska has for the most part originated in certain plantations established with trees shipped in from Minnesota. In the opinion of the State men who have studied the situation the scale has been spread from one or two infested places by birds, particularly by crows. Crows have established many rookeries in the older coniferous plantations throughout central Nebraska. For several years it has been noticed that the number of crows in the Nebraska Forest plantations is increasing; so that if the crow is an agent in the spread of the scale the presence of the insect in these private plantations greatly endangers the success of the Nebraska Forest project. Realizing that if the scale spreads widely over Nebraska it will cause a severe setback to tree planting in the State, the Nebraska extension forester has made control of the insect one of his major projects. The supervisor of the Nebraska National Forest is keeping a close watch for evidence of the insect on plantations within the forest.

So far the scale has been found mostly on jack pine, but it has also been found on Scotch pine.

Chestnut Trees Available for Tannin Extraction Many Years After Death

Chestnut trees 20 to 30 years dead show no appreciable diminution of tannin content, according to the results of a recent study by pathologists of the Bureau of Plant Industry. Cooperators in this study included 16 chemists, most of whom represented companies manufacturing chestnut-wood extract. Specimens of wood of representative live and dead chestnut trees averaging about 12 inches in diameter were collected from five localities in the southern Appalachians. Because of the wide variation even among similar trees from the same plot, composite samples were made from 5 trees each in the earlier work and later from 10 trees each. Analyses were made according to the official method of the American Leather Chemists Association.

Because it was desired to test trees that had b
dead for a considerable number of years, blight-ki
chestnuts could not be used in the study. The t
were made on trees that had been killed by girdlin
by fire. In reporting the findings, however, Path
gists R. M. Nelson and G. F. Gravatt apply t
directly to the great quantities of chestnut timber
have been killed by blight in this country within
past few years. Previous investigations showed
the action of the chestnut-blight fungus, which
not decay the wood appreciably, does not lower
tannin content of trees attacked by the blight. T
of decayed heartwood and sapwood made in connec
with the present study indicated, also, that the ac
of decay-producing fungi reduces tannin content
slight degree only.

Analyses made in the course of this study sho
that in live chestnut trees tannin constitutes betw
10 and 12 per cent of the bark, between 7 and 11
cent of the heartwood, and between 3 and 4 per
of the sapwood. In both living and dead trees
tannin content was very great in the roots and
slightly greater at heights of 3½ feet and 44 feet
at 25 feet.

No marked correlation was found between spe
gravity and tannin content, whether in green, so
dead, or decayed chestnut wood.

Virginia Farmer Buys Woodland W Its Own Timber

By Gordon Furr

On a recent visit to a small farm in Fairfax Cou
Va., as I approached the house I saw cords of po
gum, pine, and white oak on the road, as well as f
trees in the woods ready to be cut into cord len
This surprised me, for last year the owner had give
to understand that he did not intend to sell any
timber off his place; in 1921–22 he had cleared $
by selling timber off his 47 acres. (Forest Wo
May, 1928.) The reason, I found, was that he wa
to make timber pay for an addition to the farm-
tract of woodland from which he was getting the ti
This tract of woodland, 97½ acres, he had bough
$3,000.

Since November, 1928, this farmer has sold 100
of poplar and gum to a pulp and paper mill at $
cord, placed on the road one-half mile from the w
Cutting and hauling to the road cost $4, leaving a
of $5 per cord. The pine and oak, 56 cords, he so
Alexandria, Va., for firewood at $13 a cord. The
wood cost about $3.50 per cord to cut and place o
road. In addition he has sold 200 locust posts t
county of Fairfax at $0.50 per post. They wer
for $0.20 apiece, giving him a profit of $0.30 per
He has an order for 500 more if he can find time t
them. I told him that he was not charging enou
his posts, as such posts were bringing $0.75 ea
Middleburg, Va., and vicinity. He only laughe
said, "I guess I should help the county a little."

he profit from the timber already sold amounts to it a third of the purchase price of the tract. With od deal of time still left before his 3-year note for purchase matures, it looks as if the farmer would eed in what he set out to do, to make his new land for itself.

mber Requirements in Western and outhern States Greatly Changed Since 910

a period of approximately 18 years ending with industrial wood requirements increased by 107 cent in the Inland Empire States (Idaho and tana) and by 34 per cent in the Southern Rocky ntain States (Colorado and New Mexico), accord- to reports received by the United States Forest ice from wood-using industries in those States. he Prairie States (Iowa, Kansas, Nebraska, and Dakotas) the corresponding regional increase was 1 per cent. These comparisons are based on returns in a survey of the quantities, kinds, and s of wood used as raw material in 1928 by indus- in the United States, which has been completed the Forest Service with the cooperation of the au of the Census. The totals reported for the es in these three groups for 1928 and totals reported he same States in earlier surveys of similar char- r are as follows:

Lumber Requirements of Wood-Using Industries

	Requirements (thousand board feet)		Increase or decrease (per cent)
	In 1910	In 1928	
d Empire:			
daho	132, 739	297, 087	+124
ontana	58, 719	100, 011	+70
Total	191, 458	397, 098	+107
	In 1912	In 1928	
hern Rocky Mountain States:			
rizona	35, 288	33, 284	−6
olorado	36, 961	64, 918	+76
ew Mexico	36, 946	59, 291	+60
tah	14, 875	9, 884	−34
yoming	2, 954	2, 477	−16
Total	127, 024	169, 854	+34
	In 1911	In 1928	
ie States:			
owa	262, 597	220, 388	−16
ansas	61, 107	62, 154	+2
ebraska	27, 870	46, 881	+68
orth Dakota	1, 086	3, 286	+202
outh Dakota	6, 059	21, 508	+255
Total	358, 719	354, 217	−1

In Idaho and Montana the principal wood-using industries are the manufacture of planing-mill products and sash, doors, and blinds, and general millwork. The regional increase of 107 per cent is due principally to development of the sash, door, and blind industry in both States. In the Southern Rocky Mountain States substantial increases were shown in the quantities of lumber required for construction and repair of railroad cars in Colorado and for the manufacture of boxes and crates in Colorado and New Mexico. The increases in these two States more than offset the decreases registered in Arizona, Utah, and Wyoming. In the Prairie States, Nebraska and South Dakota showed substantial increases, due to increase in the quantity of lumber consumed in car construction and repair, the manufacture of boxes and crates, and, in South Dakota, the growth of the sash, door, and blind industry. These increases, however, are more than offset by the net decrease in Iowa, which has apparently lost the greater part of its horse-drawn vehicles industry and of a woodenware and novelty manufacturing industry that in 1911 required 20,000,000 feet of lumber.

Forest Conservationists Petition the President

On October 30 some 50 men representing 22 nationa and regional organizations interested in forest conservation called on President Hoover and petitioned his support for a balanced program of Federal forestry activities and for more adequate protection of Government-owned forests from fire. The group had gathered in Washington, D. C., at the invitation of the American Forestry Association. George D. Pratt, president of that organization, voiced an appeal for the granting for 1931 of the Federal appropriation of $3,000,000 for the acquisition of forest lands authorized by the Woodruff-McNary Act. This act authorized appropriations for the acquisition of land for national forest purposes in the amounts of $2,000,000 for the fiscal year 1929, $3,000,000 for the fiscal year 1930, and $3,000,000 for the fiscal year 1931; but for 1930 only $2,000,000 was actually appropriated by Congress for such acquisition. Robert P. Bass, former Governor of New Hampshire, told the President that his leadership was needed in the formulation and execution of a national policy of forest development and conservation giving reasonable assurance of meeting the future economic and social needs of the country. "As the first step to that end," he said, "we petition for larger appropriations under existing congressional authorization for forest fire protection, reforestation, and tree planting, the purchase of forest land by the Federal Government, and research." John W. Blodgett, of Grand Rapids, Mich., representing the lumber industry, pointed out the need of industry for forest research and protection on an adequate scale.

Secretary of Agriculture Hyde spoke in advocacy of the reforestation of marginal and submarginal lands. R. Y. Stuart, Chief of the Forest Service, outlined a more far-reaching forestry program involving Federal cooperation with forest owners and industries in efforts to abolish destructive forest exploitation and expand forest research; Government assistance in strengthening and stabilizing the forest industries, and amplified Federal forestry assistance to farmers and other sm landowners; a study of Government regulation of f est exploitation; increased fire protection for for lands; great extension of Federal and State for ownership; and the bringing about of more compl productivity of public forests, especially through bet protection, more intensive management, and an a quate program of planting.

Foreign Notes

Canadian Timber Supply

In its report to the Third British Empire Forestry Conference, in 1928, the Canadian Forest Service estimated the forest area of Canada at 1,151,454 square miles, or 32.5 per cent of the Dominion's total land area. Of this total 311,234 square miles is occupied by accessible merchantable timber and 554,646 square miles by accessible young growth; the timber on the remaining 285,574 square miles is at present unprofitable or inaccessible.

Such data as are available to the service indicate that the coniferous timber of merchantable size includes about 382,677,000,000 board feet of saw material and about 799,321,000 cords of small material, and that the broad-leaved timber of merchantable size contains 41,960,000,000 board feet of saw material and 322,672,000 cords of small material.

It is believed that 77,038,000,000 board feet of saw timber is contained in the Eastern Provinces, 26,822,000,000 board feet in the Prairie Provinces, and 320,777,000,000 board feet in British Columbia.

Merchantable stands of spruce are estimated to contain 98,174,000,000 board feet of saw timber, those of Douglas fir 68,886,000,000 board feet, and those of white pine 15,183,000,000 board feet. The merchantable saw timber of broad-leaved species is estimated to include 15,981,000,000 board feet of poplar, 9,817,000,000 board feet of yellow birch, and 5,818,000,000 board feet of maple.

More than 90 per cent of the total forest area in Canada is owned by the Dominion and the Provinces. The Dominion and provincial governments spend some $7,000,000 a year in administering, protecting, and developing forest resources. They receive as forest revenue about $17,000,000 annually, exclusive of the revenue from fish and game.

* * *

In preparation for making an inventory of Ontario forest resources the forestry department of the Province this fall had three men sketching forest types from airplanes. The plan was to use the aerial survey as a method of "cutting out" large areas that are practically without forest growth.

Government Forestry Progress in Gre Britain

The British Forestry Commission's net acquisit of plantable land amounted to 31,075 acres in the y ending September 30, 1928, according to the comn sion's ninth annual report. With this increase commission's plantable lands totaled 275,913 ac and only 57,287 acres remained to be acquired un the current program. During the year 21,496 ac of State forest land was planted with conifers. total area planted by the commission in the 9-y period ending with September, 1928, was 116, acres. Forest worker's holdings formed during year numbered 133, making the total 490, and such holdings were in process of formation at close of the year.

Danish Christmas Trees

In Denmark the Christmas-tree industry flouris under especially favorable conditions—the demanc large, the location of most of the forests permits ch and easy transportation of the trees by water to Cop hagen, the great seaport population center, and gr quantities of trees are available as thinnings beca of the custom of thickly underplanting spruce. many of the forests the trees are set out in rows ab 6 feet apart, 2 feet or less apart in the row. Beca of shade the trees develop slowly; but thinnings cuttings in the overwood, stimulating the nitrifica of humus, enable them to develop dense foliage good growth. Douglas fir brings the best price the Christmas-tree market, because of the beau symmetry of the young tree and its dense foliage open branching. Spruce and pine are the favorites. True fir is seldom raised in Denm because of aphids. The present tendency is to trees smaller than the 8 to 10 foot size hitherto popu

* * *

British timber buyers have contracted with U. S. S. R. for 750,000 standards of Russian tim to be produced in 1930, according to the Timber Tr Journal (London).

Personals

obert M. Ross has resigned as commissioner of
stry, Vermont, to become secretary of the Con-
icut Forestry Association. He is succeeded by his
tant, Perry H. Merrill.

. H. Lentz, forest extension professor and forestry
p director of the New York State College of For-
y, joins the United States Forest Service December
silviculturist at the Southern Forest Experiment
ion. He will be assigned to a study of erosion in
earing on flood control. Mr. Lentz is a member
he 1917 class of the Yale School of Forestry. He
me a teacher in the ranger school of the New York
e College of Forestry in 1921 and has been a mem-
of the faculty at Syracuse since 1923. While on
e in 1928 he was employed by the State of Louisi-
to make a study of the hardwood bottom lands
hat State.

obert S. Maestri has been appointed commissioner
onservation of Louisiana, succeeding V. K. Irion.

eslie E. Sawyer has accepted appointment as
nsion forester of Illinois, succeeding C. J. Telford.
Sawyer was graduated from the Michigan State
ege in 1924 and for the past five years has been
hing forestry in the Georgia State College of
iculture.

fficers elected for the year 1929–30 by the National
ociation of State Foresters are: President, Charles
Vilber, New Jersey; vice president, Page S. Bunker,
bama; secretary-treasurer, E. O. Siecke, Texas.
v members of the executive committee are J. S.
mes, North Carolina, and Rutledge Parker,
ntana.

ames R. Garfield, formerly Secretary of the Interior
now engaged in private law practice in Cleveland,
io, has been named by President Hoover as head of
commission on conservation and administration of
public domain. Other members of the commission
Elwood Mead, Commissioner of the Reclamation
reau; George Horace Lorimer, editor of the Saturday
ening Post; Mary Roberts Rinehart, Washington,
C.; R. K. Tiffany, Olympia, Wash.; Rudolph
chler, Phoenix, Ariz.; Charles J. Moynihan, Mont-
e, Colo.; George W. Malone, State engineer, Nevada;
lliam Peterson, Logan, Utah; I. H. Nash, Boise,
ho; Perry Jenkins, Big Piney, Wyo.; I. M. Brand-
d, Helena, Mont.; E. C. van Petten, Ontario, Oreg.;
llace Townsend, Little Rock, Ark.; H. O. Bursum,
orro, N. Mex.; James P. Goodrich, former Governor
Indiana; Gardner Cowles, Des Moines, Iowa;
ntley Spaulding, Rochester, N. H.; and W. B.
eeley, Seattle, Wash. Secretaries Wilbur of the
partment of the Interior and Hyde of the Depart-
nt of Agriculture are ex officio members of the
nmission.

Lee A. Strong, assistant director of agriculture of the State of California, has been appointed Chief of the Plant Quarantine and Control Administration, United States Department of Agriculture. Mr. Strong was formerly connected with the department as a specialist in plant quarantine work. In his new position he will serve ex officio as chairman of the advisory Federal Plant Quarantine Board. C. L. Marlatt, Chief of the Bureau of Entomology, retires as Chief of the Plant Quarantine and Control Administration at his own request, in accordance with a plan authorized some two years ago.

S. Bryan Jennings, of Jacksonville, Fla., who has served as president of the Florida State Board of Forestry since it was created two years ago, has been reappointed to the board.

C. Edward Behre has been appointed director of the Northeastern Forest Experiment Station, succeeding John S. Boyce, now professor of forest pathology at Yale University. Mr. Behre has had some four years' experience in the work of the station, having first joined the staff in 1923 as associate silviculturist. Previous to that time he taught forestry in the University of Idaho for five years. He is a specialist in forest mensuration, in which field he is the author of numerous publications, and has done important work in developing methods for statistical analysis of measurements of tree form. A member of the Yale forestry class of 1917, he is secretary-treasurer of the Yale Forest School Alumni Association and editor and manager of the Yale Forest School News.

Lewis C. Everard has resigned as editor and chief of educational cooperation, United States Forest Service, to become editor for the American Association of Museums. Mr. Everard first joined the Forest Service in 1915, coming to the position of editor from that of instructor in English at Yale University. He became chief editor of the Department of Agriculture in 1919, later engaged in economic, statistical, and editorial work for the War Finance Corporation, and returned to the Forest Service early in 1925. In his new position Mr. Everard will have charge of the editing, distribution, and sale of all the publications of the association, including the periodical The Museum News.

Harold B. Shepard has been appointed to the staff of the Office of Forest Economics, United States Forest Service, to initiate a study of forest insurance for which Congress has made a special appropriation available during the current year. At the outset the study will be concentrated in the Pacific Northwest. Mr. Shepard comes to this work with 10 years' experience as forester for pulp companies and as consulting forester and 4 years' experience in fire-insurance work.

Marshall S. Wright has resigned as assistant engineer in the Washington office of the United States Forest Service, to become western representative of the Aerotopograph Corporation of America. Mr. Wright's connection with the Forest Service dates from 1919, when he was transferred from the General Land Office to take charge of entry survey activities in the Intermountain National Forest District. He has been stationed in Washington since 1923, and for the past two years has had direct charge of maps and surveys for the service as a whole. The corporation with which he has accepted employment is a branch of a world organization engaged in making topographic surveys from airplanes, and is headed by C. H. Birdseye, recently chief topographic engineer of the Geological Survey.

H. M. Sebring has left Florida, where he was district forester, to become assistant State forester of Georgia, succeeding F. B. Merrill.

Ralph W. Hayes, who has taught forestry at the University of Louisiana for the past three years, is now teaching under J. V. Hoffman in the forestry department organized this year by the North Carolina State College. Mr. Hayes, who is a forestry graduate of the Iowa State College, was formerly connected with the forestry staff of the Office of Indian Affairs, and began his work as a teacher at the Colorado State College. DeLanson Lenhart, who was graduated from the Pennsylvania State Forest School in 1927, is at the North Carolina College as a graduate assistant in the forestry department.

John H. Hanley has resigned as junior forester, Central States Forest Experiment Station, to engage in advanced study in the University of Illinois.

P. T. Gillett, a forestry graduate of Cornell University, has been appointed county forester and assistant county agent in Chautauqua County, N. Y., succeeding J. E. Davis.

Louis C. Fleck, chemist, I. B. Lanphier, engine and Ervin Kurth, chemist, resigned from the staff the Forest Products Laboratory on November 1 accept positions in the industrial field. Doctor Fle a University of Wisconsin graduate of 1917 who been making researches in the chemistry of wood the laboratory since 1921, will engage in wood-cellul research for the Kimberly-Clark Co. at Kimbe Wis. Mr. Lanphier, a Wisconsin graduate in c engineering who has been attached to the contai testing laboratory since 1921, is entering the pack research laboratory of the 4–One Box Machine Mal at Rockaway, N. J. Mr. Kurth, a member of the 1 class of the University of Wisconsin who has b studying wood extractives, is joining the Du P organization and will be assigned to a plant in East or South.

Members of the Northeastern Forest Resea Advisory Council who have been reappointed by Secretary of Agriculture for 3-year terms are J. Toumey, Yale School of Forestry; W. R. Bro Brown Co., Berlin, N. H.; R. S. Kellogg, secreta News Print Service Bureau, New York City; and W Slate, jr., director, Connecticut Agricultural Exp ment Station.

Alfred E. Smith, former Governor of New Y has accepted membership on the board of trustees of New York State College of Forestry, succeeding late Louis Marshall.

Jesse D. Sinclair has been appointed assist forest ecologist at the Southern Forest Experim Station. Mr. Sinclair received the B. S. degree f the University of California in 1926 and the M degree from the same institution in 1929.

E. C. Sherrard, acting in charge of the sectio derived products, Forest Products Laboratory, been elected chairman of the cellulose division of American Chemical Society, succeeding J. L. Pars

Bibliography

An American View of Swedish Forestry

By E. N. Munns, United States Forest Service

George Sargent Perry's book on forestry in Sweden holds much interest for a recent visitor to Scandinavia and should appeal to all those who are desirous of knowing more about the forest conditions and problems of northwestern Europe. It presents a general view, historical and legal, of local conditions as they have developed through the last few centuries. Types, trees, and silvicultural practices are described in detail. The economics of land use and of forest management are well treated. Utilization, taxation, and regulation are not overlooked.

Professor Perry finds three reasons for the promising progress of Swedish private forestry: "(1) The Government on its extensive areas is practicing the possible methods and making it pay; (2) careful perimental work lies back of most methods in use, there is no dearth of funds to support forest resea (3) laws compel landowners to take proper manager measures or forfeit both land and crop under cer conditions."

Not only does the author consider the forest a saw it locally, but here and there he brings in trasts, drawn "from the viewpoint of an Amer forester," between the Scandinavian conditions those of the United States; and his own commen Swedish practices gives added value to the w Some of the things he points out are well worth ha called sharply to attention, such as that with modern tendency favoring natural regeneration m s we are devoting too much educational attention to tificial regeneration; that seed can be taken from lder localities to warmer with far greater success an from warmer to colder; that local species are of eater value than exotics; and that charts are more lpful than tabulations, whether for propaganda or management purposes.

A number of things are missing from Perry's work. ne most important omission, from my point of view, a full discussion of the various economic timber rveys. No doubt this is due partly to the fact that ich of the information on which the book is based s collected in 1923, before the surveys had pro- essed very far; but the treatment of the subject ggests that the author failed to grasp the full signifi- nce attaching to such surveys, especially in a country ere continued prosperity seems to depend abso- ely upon continuous forest production. We in the ited States need, and need badly, data such as are ing obtained through these surveys, as a basis for r own forest land policy and for a proper understand- of our forest problems.

It is hoped that the appearance of this book, describ- the forestry practices of Sweden, will not increase tendency already evident in some quarters to cept blindly the teachings of the Swedish school of ought as applicable in the United States. It should fully recognized that European conditions are differ- t from those in the United States. However, the ok should be widely read by foresters, no matter ether these style themselves silviculturists, forest nagers, or economists. Particularly should it be d by research men, teachers, and those intending to it Scandinavia.

(Perry, George Sargent: Forestry in Sweden and ljacent Lands from the Viewpoint of an American rester. Published by the author, Mont Alto, Pa., 29.)

anuals on Kiln Drying, Air Seasoning, and Gluing Wood

After years of experiment and experience the Forest oducts Laboratory is bringing out, with increasing quency, useful complete manuals for the handling of est products. Two years ago the results of 20 ars' accumulation of information about pulping were ought together in Department of Agriculture Bulle- 1485, The Suitability of American Woods for Paper lp. In the last two years three manuals that cover a comprehensive way the seasoning and gluing of od have been prepared at the laboratory. In addi- n a tabular statement of the strength of North nerican woods, the outcome of tests made at the oratory, has been published.

The most recent of the manuals, The Gluing of ood, by T. R. Truax, Department Bulletin 1500–D, ovides information for the improvement of shop actice in plants that glue wood. It describes the operties of glues used in woodworking, gives methods for testing glues, and discusses fully the preparation of glues for use and the operations involved in gluing wood. It also describes methods of correcting gluing defects and of calculating pressure on joints. Thirteen plates and 18 figures illustrate important points discussed in the text.

The Air Seasoning of Western Softwood Lumber, by S. V. Fullaway, H. M. Johnson, and C. L. Hill, Department Bulletin 1425, presents principles and practices intended to aid in reducing the losses from air seasoning in western yards, shorten the average drying time, and lower shipping weights on western softwood lumber. Approximately 35 per cent of the annual cut of the principal western lumber-producing regions, or about 4,500,000,000 feet, worth $120,000,000, is air seasoned. Competition is keen and improvement in seasoning methods is highly desirable. The bulletin begins with a discussion of the principles of air seasoning, but the major part of the text is given up to suggestions of a concrete and practical nature in regard to the layout of the yard, the handling of the stock, the construction of the piles, and the solution of the particular drying problems of the Douglas fir, Inland Empire, California pine, and redwood regions. The text is illustrated by 8 plates and 10 figures.

The Kiln Drying Handbook, Department Bulletin 1136–D, by Rolf Thelen, is a complete manual for the operation of dry kilns for seasoning lumber, with suggestions for the drying of other partly manufactured wood specialties. Drying schedules and seasoning specifications with special schedules for aircraft lumber, bent stock, plywood panels, etc., are included. The bulletin contains 16 plates and 14 figures.

In general the information contained in these manuals is based on experimental work at the Forest Products Laboratory, Madison, Wis., and has been tested in commercial practice. They are at once practical helps to the manufacturer, embodying scientific and commercial experience and test results, and aids to forest conservation in that they all look to the more efficient use of the timber supply of the Nation. Copies of all of them may be obtained, while the supply lasts, from the Office of Information, United States Department of Agriculture, Washington, D. C.

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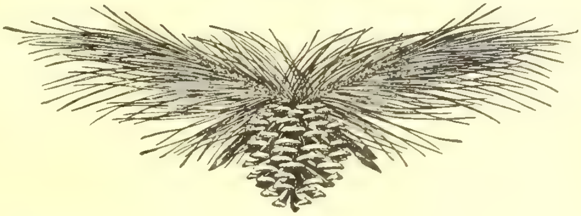

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Announcements

Twelfth Southern Forestry Congress

The Southern Forestry Congress will hold its twelfth annual session in Memphis, Tenn., April 10–12. As secretary of the congress, R. S. Maddox, State forester of Tennessee, is arranging the program. Headquarters will be at the Peabody Hotel.

Pan American Agricultural Conference

The Inter-American Conference on Agriculture, Forestry, and Animal Industry to be held at Washington, D. C., in 1930, plans for which were initiated under the auspices of the Pan American Union, has been taken over by the United States Government. Congres
been asked for an appropriation for the meeting,
the President, through the State Department, is t
vite the other Pan American countries to send
gates. The conference has been postponed to Sep
ber. The purpose of the meeting is to discuss
formulate practical means of international cooper
looking toward the most effective and orderly utiliz
and conservation of agricultural, forest, and rang
sources of the independent countries of the Amer
with special reference to the Tropics. It is expe
that forest and range resources will occupy a promi
place in the deliberations of the conference.

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State Forestry

nsylvania Buys 132,000 Acres of Forest Land

y a single purchase recently closed the State of nsylvania has enlarged its forest land holdings by 000 acres. This total will be allocated on the basis),226 acres to the department of forests and waters 61,910 acres to the State game commission. The is located in 11 counties. It was purchased from Central Pennsylvania Lumber Co. at $3 per acre. uisition expenses bring the total cost to considerably e than $400,000.

w York Amends Constitution to Provide for Emergency Funds for Fire uppression

s a result of votes cast in the fall election of 1929 the v York Constitution now recognizes forest fire pression as a cause for which the State may justifi- incur debt. Heretofore the constitution has not horized the State government to borrow money for purpose other than to repel invasion, suppress urrection, or defend the State in war. The State's servation law provides that the comptroller, with approval of the governor, may borrow as much as 0,000 for forest fire suppression in any fiscal year of ergency fire conditions; but a question as to the stitutionality of this provision has made it in- rative since 1926. To validate the provision it was essary to have a proposal for a constitutional endment approved by two sessions of the legislature finally approved by a popular vote. The proposed endment was given enthusiastic nonpartisan support was approved at the polls by a vote of more than 1.

estern North Carolina Farmers to Cooperate in Marketing Wood Products

s a step toward the organized marketing of farm d products in western North Carolina, the Farmers eration has created a wood products department. new department is headed by H. Rotha, formerly the Champion Fibre Co. and the woods department of the Eastman Kodak Co. The department plans to handle pulp, extract wood, locust for insulator pins, dogwood for cotton mill shuttle blocks, all kinds of logs for sawmill and veneering purposes, telephone and telegraph poles, and every other type of wood product that western North Carolina farmers may have to sell; to seek to interest wood-working industries in locating in western North Carolina; to encourage reforestation and the production of forest planting stock; and to ship plants such as rhododendron, azalea, and ivy for landscaping purposes.

In purchasing wood products the department will withhold 2½ per cent of the purchase price and credit it to the seller in stock. The capital established in this way will be used to promote the establishment of wood-working plants in western North Carolina.

The Farmers Federation estimates that woodlands occupy 1,811,818 acres of the farms in 23 mountain counties of western North Carolina, and that 183,230 acres of these farms may be classed as cleared but idle. In announcing its new enterprise the federation states that its purpose is "to make the vacant farm lots produce a regular income for the farmers and landowners."

West Virginia Commercial Forestry Conference

West Virginia's forestry problems were thoroughly aired by a large group of economists, foresters, and governmental and industrial executives in the West Virginia Commercial Forestry Conference held in Charleston on December 4 and 5. Held with the assistance of the United States Chamber of Commerce and with full participation by both State and Federal Governments, the conference was characterized by recognition on the part of private enterprise in the State that West Virginia's forest resources are worth looking after.

L. C. Gray, economist in charge of the division of land economics, United States Department of Agriculture, told the conference that the tendency to depopulation of certain sections of West Virginia as a result of the decadence of agriculture and the passing of the timber must not be regarded as a temporary phenomenon. A program of reforestation is imperative, he said, if prosperity is to be restored to all sections of the State. The meaning of West Virginia's forests to her leading industries and to recreational and other interests of her people was described by a representative of each. Forest fire protection needs, possibilities, and responsibilities was discussed by A. B. Hastings, in charge of the cooperation of the United States Forest Service with State forestry organizations; Franklin W. Reed, forester of the National Lumber Manufacturers Association; and George E. Brooks, secretary of the Southern West Virginia Forest Fire Protective Association.

David G. White, trade extension manager of the Appalachian Hardwood Club, Cincinnati, called attention to West Virginia's large exports of hardwoods and to the economic waste involved in transporting these supplies away from the State to be manufactured at points no more advantageously located in relation to centers of consumption.

State Forester H. S. Newins told the conference that 60 per cent of the area of West Virginia is potential forest land, but that the State's timber, like its coal, has been exploited recklessly and that at present a decline is remarked in the local supply of timber of the kinds desired for use in the mines. W. N. Sparhawk, forest economist of the United States Forest Service, said that whereas second-growth timber in West Virginia, as elsewhere, has been treated rather like a stepchild, money is better spent in improving second-growth stands than in planting trees on areas where forest reproduction is lacking.

C. P. Winslow, director of the Forest Products Laboratory, and others spoke on wood utilization, and Newton Thomas, of the Carbon Fuel Co., described the benefits of preservative treatment of wood.

T. C. Townsend, State tax commissioner, declared that it would be impossible to replace the forests of West Virginia on a commercial scale without amending the State constitution so as to permit changing the State tax system.

Banquet addresses, including a talk on "forestry in commerce," by William Butterworth, president of the United States Chamber of Commerce, and a discussion of "forestry as it is" by R. Y. Stuart, Chief of the United States Forest Service, were broadcast.

Resolutions adopted by the conference recommended that the State make use of every facility at its command to follow out intensive forest research, make additional funds available for the extension of its forest-protection system, and acquire land on which to demonstrate forest management to landowners; that the Federal Government provide the full appropriations authorized for forest research under the McSweeney–McNary law, substantially increase funds available for soil erosion study in cooperation with the States with the view of flood prevention, and expand the program of national forest acquisition and development in West Virginia; that private groups and individuals unite with State forces in efforts to bring new woodworking industries
into West Virginia and to amend the State's tax
so as to make the field more inviting for the loc
and operation of such industries; that State and pr
agencies work together for the adoption in West
ginia of methods of forest taxation that will pro
timber conservation and reforestation through pr
enterprise; and that all the State's educational age
assist in further development of public interest
sound and complete forestry program.

The conference had its climax in the forming
permanent organization, the West Virginia For
Association. Officers of the new association
President, John Raine, Rainelle; vice presid
A. B. Brooks, Wheeling, Mrs. W. E. Chilton
Charleston, and Thomas G. Clagett, Bluefield; s
tary-treasurer, Ross Johnston, Charleston.

Detroit News Campaigns for Reforestation

The Detroit News is appealing to citizens of Mich
to take a direct part in reforesting idle cut-over
owned by the State. Telling its readers that the
now owns 1,390,000 acres of tax-reverted land and
land is reverting to the State because of nonpayme
taxes at the rate of 250,000 acres a year, the News
sents a special offer authorized by the director of
servation. This offer enables any individual or or
zation to bring about the reforesting of 40 acres or
of the State's idle land by paying the labor cos
planting, $2.50 an acre. The State will provide
ling trees for planting and will meet all expense
volved other than that for labor. Donors will be
fied of the exact location of the plantings made pos
by their contributions, and the plantings will be
manently marked with the donors' names at the exp
of the News. Areas planted under this plan are t
set aside as permanent forest reserves, on which
State pledges itself to plant a tree for every one
may be cut in the harvesting of a timber crop or
stroyed by fire, insects, or disease.

Potlatch Co. Makes First Applicat Under Idaho Forest Taxation Law

The first applicant for classification of land unde
new reforestation law of Idaho was the Potlatch I
ber Co., which asked to have the provisions of the
applied to nearly 46,000 acres of cut-over land.
vidual quarter sections of this land are said to hav
as much as 10,000,000 board feet of white pine.
company has refrained from offering the land for
as suitable for farming partly because the cos
clearing it is estimated at from $150 to $300 per
and partly because it is subject to frosts throughou
year. Fire protection has been provided by
company through the Potlatch Timber Prote
Association.

v York Counties Prompt to Claim State Aid in Reforestation

re than one-third of New York's 62 counties have dy taken steps to avail themselves of the State aid orestation work for which a law of 1929 provides. ls appropriated by the counties for forestry pur- amount to $68,956. If the plans of all the coun- ipplying for State aid in reforestation work meet the approval of the conservation commissioner heir appropriations are matched with State money a maximum of $5,000 a year for each county, as ided by law, $53,000 of State money will be paid e counties for use in establishing county forests. les making this financial contribution the State is ared to supply the counties with free planting and with technical forestry advice.

e County has appropriated $21,000 for county estation work.

ansas Forest Protective Association Meets

the first annual meeting of the Arkansas Forest ective Association, held in Little Rock December Villiam L. Hall reported as secretary that the press kansas had given the association good cooperation ng the year in handling forestry educational pub- . E. Murray Bruner, of the United States Forest ice, commented on his preliminary findings in a ey of Arkansas forest conditions which had been ertaken at the request of Governor Parnell. Mr. ier tentatively estimated the total woodland area rkansas at 22,000,000 acres, including 2,000,000 in Federal and State ownership. This woodland represents 65 per cent of the State's total land . Of the total woodland area in private ownership data indicate that 32.5 per cent is in holdings of 0 acres or more. From 1,000,000 to 3,000,000 acres ut-over land has been rendered desolate and prac- ly worthless as the result of annually recurring . Organized action by the State, Mr. Bruner de- ed, is absolutely essential to adequate protection of ansas forest lands from fire. The responsibilities e State government and those of the general public the private landowner in relation to forest fire pro- on were discussed by A. B. Hastings, of the United es Forest Service.

e supervisors of the Ozark and Ouachita National sts, Ark., reported that although the fire season of was one of the worst on record less than 2 per of the Government-owned land included in these ts had been burned over during the year. It was ght out that the fire score had been held to almost lly low figures on certain private holdings in the e, although on other holdings the proportions ed over ranged as high as 15 per cent.

e association agreed to sponsor a bill to be pre- ed to the general assembly of the State at its next regular session, in 1931, providing for the creation of a forestry commission of five members, which would employ a State forester. The proposed commission would consist of the commissioner of mines, manufacture, and agriculture, the dean of the agricultural college of the University of Arkansas, one lumberman landowner, one wood-lot farmer, and one United States forester. In another resolution the association called on the people of Arkansas to consider carefully the problem of restoring forest lands in the State to a high degree of productiveness so that they may bear their share of tax burdens and may continue to provide forest products needed by the people and to sustain a large group of industries.

Railroad Does a Good Safety Strip Job by Proxy

In the Gallitzin forest district of Pennsylvania, headquarters of which are in the city of Johnstown, the proportion of forest fires caused by railroads decreased strikingly in 1929. This change is attributed by District Forester T. I. Shirey to an agreement by which the Pennsylvania Railroad arranged to have him do at its expense whatever safety-strip work he thought was needed on its lines within the district.

In the 10-year period 1916–1925 railroad-caused fires composed 28 per cent of the fires occurring in this district. In 1927, despite weather conditions especially unfavorable to fire, they made up 34 per cent of the total. In 1928, under an agreement whereby section gangs of the railroad worked on safety strips in spare time under the direction of State forest inspectors, railroad fires were reduced to 20 per cent of all. This arrangement was found unsatisfactory in that it was difficult to get the men to understand what they were to do, the short hours during which the gangs were available for the work were grouped in the middle of the day when burning was dangerous, too much time was lost in transportation, and costs were high. Under the arrangement agreed upon for 1929 forest inspectors hired a crew to do the safety-strip work under their direction, the railroad paying the wages of the crew, paying for the time and expenses of the inspectors, and also taking responsibility in case of injury to the men or of damage to property from the escape of fire. Inspectors and crew spent the mornings of wet days in preparing strips, cutting out logs and trimming brush, and raking a clean, wide backstrip. Burning was usually done late in the day. The season's work cleaned up more than 70 miles of the most hazardous safety strips in the district. The few forest fires that occurred before this work was finished caused no serious damage, only one serious railroad fire occurred in the district (this was on a division where no safety strip work was done), and railroad-caused fires constituted only 7 per cent of the district's total for the year.

New Hampshire Fire Score Low Despite Drought

In spite of the severe drought experienced in 1929, the woodland area covered by fires in New Hampshire during the year was 63 per cent below the 10-year average. It totaled 2,200 acres. The number of forest fires occurring in the State during the year was 525, or 90 per cent of the 10-year average. Only 63 fires burned more than 10 acres and only 6 burned more than 100 acres.

As in previous years, the burden of blame for causing forest fires rested most heavily on careless smokers. Reports to the State forestry department charged smokers with causing 210 fires, which accounted for more than half the burned area. Railroads appeared to be responsible for 166 fires, brush burners for 54; 16 fires were declared to be of incendiary origin. Lightning started 11 fires, camp fires started 10. The forestry department acknowledges especially fine cooperation in 1929 on the part of lumbermen; although 402 separate portable sawmill settings took place in the State during the year, 186 of which were by steam mills, only 5 forest fires were reported as starting from lumbering operations.

Fire Protection Gains in Michigan

In 1929 the forest-fire division of the Michigan Department of Conservation achieved the best record of its history in suppressing fires on State and privately owned land. Although the season was unusually dry and almost twice as many fires were reported as in 1928, about 25 per cent less acreage was burned over than in that year. The fires of 1929 burned over 50,985 acres of land, the average fire covering 20.8 acres. The areas burned over included 27,597 acres of second-growth and cut-over timberland and 23,388 acres of grass plains, swamp, and hay and pasture land. Records of the forest-fire division as to the causes of the 2,450 fires reported are as follows: Smokers, 968; railroads, 326; camp fires, 143; lightning, 25; brush burning, 356; incendiarism, 121; lumbering, 59; miscellaneous, 252; unknown, 200.

Between fires the State fire wardens and their assistants found time to construct 14 district headquarters buildings, complete 201 miles of fire line and start work on 74 miles in addition, and add 68 miles to the existing 389-mile telephone system of the division. Five new fire towers were erected in the State during the year.

Specially Designed Truck Ready for Fighting on Long Island

The five new fire trucks which the New York servation Department has ready for use in the sp fire season include one specially designed to fit ditions existing on Long Island. Fires on Island are very numerous and spread with rapidity over large areas of oak and pine br and in the portions of the island that are subje forest fire water is not plentiful. The truck is desi for high speed and for a heavy load. It carri 350-gallon water tank, 6 knapsack pumps, and for a crew of 25, and has space for transportin men. A pump driven by power take-off from transmission will take water directly from the through ½-inch hose, or may be used for pumpi 1½-inch stream from a cistern or other source. ½-inch and 1½-inch linen hose are carried on truck.

Five new gasoline-driven fire-fighting pumps, supplied with 1,500 feet of linen hose, were adde the department's equipment during the past The department now has 57 pumps of this It has 2,000 knapsack hand pumps, of which were acquired in 1929. All pumps more than a old have been completely overhauled during winter at the department's Saranac Inn shop.

Tree Planting Suggested to Mark Mas chusetts Tercentenary

The Massachusetts Forestry Association propos celebrate the tercentenary of the founding of the sachusetts Bay Colony with a revival of shade- planting. Recently the association made a surve the shade-tree situation in the State, and obtained discouraging results. Many towns, it reports, completely neglected for 10 years or more to carr the planting which, as practiced by earlier generat has been responsible for the prized beauty of many State roads and streets. Urging that 100,000 s trees be planted in the State in 1930, the associa points out that if each town and city plants one for each of the 300 years this quota will be more filled. It is suggested that communities unable to nursery trees use wild stock, as many Massachu wardens have done with good results and at an exp of less than $1 per tree. The association offers p of $500, $300, and $100 to the three towns or orga tions that make the most successful half-mile stre roadside plantings, on condition that at least 10 t or organizations enter the contest.

Sterilization Gives Good Results in Pennsylvania Nursery

rilization of seed-bed soil by steaming has reduced growth by about 75 per cent and apparently has nated all damage to seedlings from white grubs damping off, in experiments carried out at the nwood State Forest Tree Nursery of Pennsylvania. saving on weeding costs is believed to have covered ost of the treatment, leaving as clear gain the val of the two foremost causes of injury to seed- in the nursery. When second crops have been on the treated soil very favorable results have d, District Forester T. Roy Morton reports.

these experiments, which were made on 4-foot seed steam was applied to the soil by means of a steam- pan 12 feet long, 4 feet wide, and 1 foot deep, of 12-gage black iron. The top of the pan was rced with angle iron and had a flange for a pipe in nter. A 7-foot handle was placed crosswise at end for moving the pan. When a seed bed had prepared as for sowing the pan was placed on it team was carried to the pan by means of a ¾-inch from a 20-horsepower steam traction engine having ler pressure of from 80 to 110 pounds. Steam was d into the pan for at least 30 minutes, and the pan eft in place for an additional 30 minutes. Dupli- pans were used alternately.

ring the fall of 1925, 4,144 square feet of soil was ized. Wet weather interfered with the work, and ost averaged $2.40 per 100 square feet. In the g of 1926, 9,000 square feet of soil was steamed at verage cost of $1.39 per 100 square feet. In the g of 1927 the experiment was continued with the ization of 11,136 square feet of soil at a cost of per 100 square feet. Adjacent to each of the ized areas check plots were left unsteamed.

seeding the steamed beds northern white pine seed used in 1925, Norway pine and Japanese larch in and northern white pine, Norway spruce, and ay pine in 1927.

every case comparison of steamed and unsteamed in the first year after steaming showed about 75 nt fewer weeds present in the former. No damage white grubs was noticeable on the steamed areas, on the unsteamed areas as many as 25 per cent of edlings showed injury from this cause. No dam- om damping off was visible on the steamed areas. seedlings planted on sterilized soil are now from fth to one-fourth larger and have a better color a more even stand than seedlings of the same s on the unsterilized soil. It was found that seed ick-germinating species such as Norway pine, pitch and spruce should not be planted until a week or ys after steaming, although northern white pine safely be sown as soon after steaming as it was ble to work the ground.

Georgia Successfully Repeats its Forest Fair

The State forest fair held at Valdosta, Ga., in November, 1929, repeated the success of that held in the preceding year at Waycross, Ga. The first day was featured by opening addresses, the second by talks on forestry in the schools; the third was naval stores day. In a nearby forest representatives of the Georgia Forest Service, the Georgia School of Forestry, and the United States Forest Service showed visiting timber owners approved methods for establishing and operating forest nurseries, planting seedlings, thinning timber, constructing firebreaks, estimating timber, and chipping pines for naval-stores production. Methods of protecting and utilizing the Georgia pines were further illustrated by an array of exhibits. The 50 exhibitors taking part in the fair included with the Georgia Forest Service several Federal bureaus, the Georgia School of Forestry, various lumber associations and forestry associations, naval stores dealers, and manufacturers of equipment used in forestry, lumbering, and the utilization of forest products.

Michigan Game Sanctuaries

Game sanctuaries in Michigan now aggregate 129,807 acres. The seven State-owned "standard" refuges, in which all game is protected, total 58,000 acres. These have year-long caretakers and are protected by fire lines and fire towers. Added to them are the 64 State parks, comprising 25,384 acres on which hunting is prohibited; other areas set aside by the legislature or by the conservation commission; and about 256 individual units of privately owned land, totaling nearly 50,000 acres, that have been dedicated as sanctuaries by their owners and placed under State protection for specified terms of years. Michigan's present wild life sanctuary law permits the dedication of privately owned areas of from 20 to 1,500 acres for periods of five or more years, and permits the owner of such an area to reserve the right to hunt or trap certain kinds of game.

◆

Etowah County, Ala., recently entered into an agreement to cooperate with the State, and through it with the Federal Government, in the promotion of forestry on nonagricultural lands. Four Alabama counties had previously taken such action. The county of Mobile has made an annual appropriation of $2,500 as its contribution toward the cost of the work. A major feature of the cooperative effort is general educational work in forest protection.

Boxelder Seed Collected by Red Squirrels

Some North Dakota red squirrels prepared a surprise for seed pickers of the State forest nursery in 1929 when they stored up quantities of boxelder seed as an article of winter diet. They collected the seed from large native trees growing along the banks of Oak Creek, which flows out of the Turtle Mountains. When the first cache of about a bushel of seed was found packed in between the trunks of a clump of boxelders it was credited to the wind; but when the second, found at the base of a large ash, was more closely examined it was found that the small twigs had been cut rather than broken. Other caches were found about 20 feet above the ground in crotches of boxelder and willow trees and in the hollow butt of an elm. Bur oak acorns and green ash seed, crops of which were heavy in 1929, apparently failed to attract the squirrels as an alternative to the boxelder seed.

◆

The will of Foster M. Voorhees, late ex-Governor of New Jersey, gives the State 323 acres of rolling hill country in Hunterdon County to be used for forestry and conservation purposes. The land, on which Mr. Voorhees had made his home for a number of years, is situated about a mile north of High Bridge on the Schooley Mountain Road. Under the name of Voorhees State Park, it is to be maintained as a forestry demonstration area, with some development also as a public recreation area.

◆

The theory that privately owned land may be condemned by the State for State park purposes is sanctioned by a recent decision of the Michigan Supreme Court. This decision upholds a verdict from the Lenawee County circuit court granting to the State 86 acres of land adjoining the Cedar Hills State Park at the price of $35,000. The State had offered $30,000, but the owner had demanded $125,000.

◆

The opening of a new district forester's office at Swainsboro, Ga., is announced by State Forester Lufburrow. Jack Thurmond, a forestry graduate of the Georgia State College of Agriculture, has been appointed to take charge of the office.

Addition to People's Forest at Barkh sted, Conn.

A valuable addition to the People's Forest in hamsted, Conn., is being made through the acti Mrs. G. E. Matthies and family, of Seymour, in g the State 210 acres of land at the southern bounda the forest. This forest, located on the west bran the Farmington River, has come into State owne entirely through a series of gifts. At present, wi area of about 1,600 acres, it represents more tha gifts of money and land from individuals and or zations.

Connecticut State Forest Administra Reorganized

Since November 1 the State forests of Connec have been administered in two districts. Di Forester S. E. Parker has charge of the western dis including all forests west of the Connecticut R except the Cockaponset, and District Forester J B. Pike, jr., has charge of the eastern district, incl all the forests east of the river. The Cockap Forest of 7,690 acres remains under the care of G W. C. Turner, whose title is changed from di forester to silviculturist. State Forester Hawes in to use this forest for silvicultural experiments and as a demonstration area.

◆

At the 1929 Mississippi State Fair the State f service displayed photographs and wood sections common trees of the State and invited young p between the ages of 6 and 18 to compete in g information on the trees shown. A form was vided for the use of contestants. A prize of $10 one of $5 were provided. The same amounts offered as prizes to the two young persons who sh submit the best posters depicting reasons why M sippi should practice forestry.

◆

In 1929 the forestry division of the Michigan De ment of Conservation planted 9,157,600 pines o State forests, reforesting 17,596 acres. The pl acreage was the highest for any year of the divis history.

Education and Extension

ts of Money and Land to Yale School of Forestry

ree lavish gifts received by the Yale School of stry early in the new year have greatly enlarged the ol's facilities both for training students and for onstrating practical forest management. Charles rop Pack has added $125,000 to the $200,000 dation he established for the school in 1929; Mr. Mrs. Starling W. Childs, who have in the past given support to the endowing of the Yale Natural Pre- e and to other university enterprises, have added ,000 to the school's endowment; and George Hewitt rs, donor of the Yale Forest at Keene, N. H., has sferred to the school 8,000 acres of forest land in heastern Connecticut.

e new school forest is located in the towns of on, Ashford, Eastford, and Woodstock. Dean ves's announcement of the gift calls attention to the that the forest is large enough for a practical oper- g unit and for the demonstration of many features orest management. The land has been protected many years and is well stocked with hardwoods, pine, hemlock. Enough merchantable timber is present ermit economic forestry operations to begin at once educational phases of the work on the forest will eveloped progressively as administrative details are ected.

athan D. Canterbury, who is a member of the 1922 s of the Yale School of Forestry and who has served ssistant State forester and State forester of Louis- a, has been appointed director of the forest.

he income from the amplified Pack Foundation will used in part for work on the new forest, in part for estigative work in features of applied forestry, and part for cooperative and general educational work ong forest owners.

ew York Ranger School Forest Enlarged

he International Paper Co. has given 500 acres of d to the New York State College of Forestry, as an ition to the school forest of the New York State nger School, Wanakena, N. Y. Officials of the col- have the privilege of choosing which 500 acres of the pany's holdings adjacent to the school forest shall stitute the gift. With this addition the ranger ool forest will have a total area of 2,350 acres.

Pack Forestry Foundation Established in University of Michigan

As a memorial to his father, George Willis Pack, Charles Lathrop Pack has established in the University of Michigan a forestry foundation of $200,000. The income from this fund is to be used by the university for the promotion of practical forest land management. Part of it will pay salary and expenses of an experienced forester to be known as the George Willis Pack professor of forest land management. In accordance with Mr. Pack's wishes it is intended that this forester shall devote his efforts principally to woods work rather than to classroom activities. The two major purposes to which the income from the fund will be devoted are the development of wild lands owned by the university and efforts in cooperation with landowners to bring about better forestry management of privately owned lands.

University lands eligible to be placed under management in pursuance of Mr. Pack's suggestions include the Chase S. Osborn preserve, presented to the university last fall by ex-Governor Osborn. This tract, comprising some 3,000 acres of Sugar Island, in the St. Mary's River, was burned over perhaps 50 years ago and is now well stocked with second-growth timber representing a wide variety of both hardwood and softwood species. It is much in need of clearings, thinnings, and improvement cuttings, Dean Dana says, and can be used to excellent advantage for research and demonstration. It is well suited in many ways, he adds, for the study of wild life and for recreational use.

Ex-Governor Osborn's gift includes a large log cabin which will serve as headquarters for men working on the tract, and also a library of several thousand volumes among which are a number of first editions and other valuable works relating to natural history. The library is housed in a fireproof building.

Pennsylvania Students Explain Choice of Forestry

When 63 freshmen of the Pennsylvania State Forest School responded to a recent inquiry as to what influence led them to choose forestry as a profession, 16 said that their decision was due to general reading, 17 attributed their choice to the influence of acquaintances or relatives who were foresters or forestry students, and 16 others indicated that theirs had been suggested by high-school teachers and friends. Study of the college catalogue was credited in 5 cases, Boy Scout influence in 3. Of the remaining answers 2 named the United States Forest Service; 2, magazine advertisements; 1, foreign travel; and 1, forest work.

New Hampshire 4–H Forestry Clubs Enroll 1,200

Four-H club forestry work took a long step forward in New Hampshire in 1929, with 1,287 boys and girls participating, Extension Forester K. E. Barraclough reports. Standard forestry club projects were undertaken by 743 of these young people and were completed by 557 of them. During the year club members made 125 leaf and wood collections, improved 423 acres of woodland, and planted 392,050 trees. The State provided the planting stock without charge, allowing 250 trees to a club member less than 16 years old and 500 to a member who had reached that age. The standard 4-H planting project consisted in the planting of 500 or of 1,000 trees, according to whether the member was under 16 years of age.

Pageantry for 4–H Club Camps

A simple camp-fire pageant modeled on Indian ceremonial has been devised by Woodbridge Metcalf, extension forester of California, for use on the opening night of a 4–H club camp. Mr. Metcalf's plan pleasantly and effectively answers the question of how to stimulate a spirit of interest and cooperation in a group of from 50 to 100 boys or girls, for the most part strangers to each other, at the outset of camp activities. The two speaking parts are those of a chief (the county club leader or the man in charge of the camp) and a visiting medicine man (one of the local leaders or the camp manager). Camp members are to take their places according to a prearranged plan around a fire already laid but unlighted. Mr. Metcalf's suggestion is that a fire of moderate size be built in log-cabin style, with three or four courses of light logs about 3 or 4 feet long laid up square and the center filled with light twigs or dry branches. The chief rises to speak of the purpose of the camp and the symbolism of the camp fire and to introduce the medicine man. He then calls on two members of the camp to stand by him ready to assist in the lighting of the fire. The medicine man expresses his good wishes for the success of the "tribe," delivers greetings and good wishes of other tribes met in his travels, and narrates a history of man's use of fire, concluding with a warning of the danger of this great power when it escapes from control. He then addresses individually the spirits of the four winds, asking them to bless the camp. The fire is lighted, and the crowd waits in silence to see it kindle as a sign that the spirits will grant their petitions. A talk by the chief on the purposes and ideals of the camp is followed with the club pledge and a song.

A second pageant, for use on any night of camp, has been written by Mr. Metcalf in which the spirits of forest, earth, water, fire, and music and fellowship are personified. This introduces a more elaborate treatment of forest influences and fire prevention.

Forestry Essay Contest for Tenn Boys

The University of Tennessee Agricultural C offering $25 in eight prizes and the American Fc Association, through the Tennessee State fores offering medals to Tennessee boys for forestry e Any boy who completed a 4–H club project of an in 1929 is eligible. Contestants are permitt choose among the following three subjects: walnut, its value, use, and production; black for timber and soil reclamation; and how wooc can be improved for timber. For information are referred to United States Department of Ag ture Farmers' Bulletins 1392 on black walnut anc and 1071 on woodlands, and to a circular on locust obtainable from the State forester. The winning first place will be published in the Tenn Farmer, a periodical of the University of Tenn Agricultural Club. A prize of $8 and a medal w awarded to the author, and a medal will be aw to his school for the ensuing year.

* * *

In Rowan County, N. C., where black walnuts planted on 600 farms in 1928, County Agent V Yeager expects even greater interest in walnut pla to result from a black walnut show held by the exte service at Salisbury in December, 1929. Prizes awarded for the best and largest walnuts entered walnut furniture, walnut wood in the rough, walnut veneers and panels were exhibited by furn manufacturers and others. Mr. Yeager has a group of 4–H club members undertaking to pla black walnut trees apiece and to keep definite re of the trees' growth for five years.

* * *

The tree-seed-gathering campaign put on in by Extension Forester Barrett, of Georgia, brc in 328 pounds of slash pine seed, 90 pounds of lob pine seed, and 38 pounds of longleaf pine seed. $934 paid to the collectors was provided by Georgia Forest School. Seed not needed for pla in the State nursery were sold at cost to foresters farmers.

* * *

The New York Legislature has appropriated $60 for a new building for the New York State Colle Forestry, Syracuse, N. Y. The new building wi erected near the southwest corner of the building occupied by the college, facing the stadium.

ansas Fair Exhibit Gives Pointers on Fence-Post Selection

suggestion for Arkansas farmers as to how they ave money by wise choice of fence-post material embodied in an exhibit prepared by Extension ster Charles A. Gillett for the Arkansas State Fair 929. New posts of 10 different woods were ex- ed together with used posts of the same species. he left were grouped nondurable species, pine, nwood, hickory, ash, and red oak. Posts of these es that had been used for from three to five years entirely rotted off at the ground line. At the were durable species, black walnut, post oak, locust, osage-orange, and red cedar. A small attached to each post named the species and gave stimated figure for the average cost of a post of species per year of use.

An Arkansas Timber Farm

ither cotton nor grain is being grown on the 2-acre farm near Star City, Ark., owned by H. H. e, of Lawrenceburg, Ill., and managed for him ohn Bradburn. The owner's plan, which Mr. Brad- is following out with the help of advice from nty Agent W. A. Trussell, is to develop the tract tly as a timber farm. Most of the area is covered a splendid stand of loblolly and shortleaf pine. whole has been fenced, and firebreaks are being tructed. Mr. Bradburn has trails throughout the ls and patrols them constantly during dry seasons. owner desires to make the farm a timber-growing onstration, with a system of roads connecting plots which approved forestry practices are illustrated. ntends to buy a portable sawmill and to cut a cer- portion of his timber annually.

ho Farmer Profits from Father's Tree Planting

anley Mallett, a farmer near Payette, Idaho, is ing money in his spare time because his father, 50 years ago, planted black locusts on odd corners s farm. Using a small homemade sawmill, Mr. Mal- manufactures the best portions of the locusts into oletrees, which find a ready market. One black st, he told Extension Forester A. M. Sowder, made salable doubletrees, besides fence posts and fire- l. With a view to growing more trees of the long lengths that produce the most doubletrees Mallett makes it his practice to remove side limbs young locusts growing up on his farm, either hing them off or using a knife.

Mississippi Farmers Construct Firebreaks

The 1929 crop of longleaf pine seed in Mississippi was an unusually abundant one, and with a view to protecting the heavy reproduction expected agricultural extension workers in the State are making a special feature of firebreak demonstrations. Forty men attended such a demonstration carried out in Lincoln County by County Agent Ashford with the cooperation of six farmers. One of the farmers furnished a team and plow, one a small spray pump, and each farmer brought an ax. Four men with axes cleared the way before the plow. The plowing was done parallel with a public road, at a distance of about 20 feet. The plowed line consisted in a single furrow where undergrowth and litter were not thick, elsewhere of two furrows thrown in opposite directions. When the plowing was finished the crew burned and cleaned the space between the plowed line and the road.

Walnut Planting on Abandoned Field Gives Good Results

George M. Danhart, a farmer near Great Cacapon, Morgan County, W. Va., provides Extension Forester Thomas W. Skuce with a concrete argument for the planting of black walnuts on farms. Some years ago Mr. Danhart noticed that certain native black walnuts growing near the Great Cacapon River seemed to have an unusually thin shell and large kernel. One fall he gathered a quantity of nuts from these trees, placed them in a tin bucket, covered the bucket so as to exclude moisture, and buried them in an old post hole below frost line. The following spring he decided to put in only one more crop in a field that had been planted to corn year after year and that was located on a mountain which his rheumatism made it difficult for him to climb. He dug up his bucket of nuts, and as he planted the corn placed a walnut in each hill. The nuts sprouted quickly, and the seedlings made good growth. They began to bear when 7 or 8 years old. At the present time, for every 10 walnuts he planted Mr. Danhart has nine 12-year-old walnut trees. The trees have grown to diameters of from 2½ to 4½ inches and to heights of from 18 to 25 feet, and are giving a good yield of nuts.

◆

The 4-H forestry club idea has taken shape in Idaho this winter. At Winchester 26 boys and girls have undertaken first-year work in tree identification and study, and a smaller group has been organized at Cold Springs.

Mississippi School Given Demonstration Forest

Forty-eight acres of land in Wayne County, Miss., has been presented to the agricultural high school of the county by the Robinson Land & Lumber Co. for use as a demonstration forest. State Forester F. B. Merrill and D. C. Ashley, agricultural teacher of the school, have prepared a plan of operation, which will be put into practice by the students under Mr. Ashley's direction. To provide a contrast to conditions brought about by protecting the area from fire, 1 acre will be burned over annually. About 16 varieties of trees are to be planted on abandoned farm land included in the tract. Last fall the school children gathered tree seed for sowing in the school forest nursery and next winter they will transplant the seedlings in the field. Located on a main highway and representing a variety of forest types, the tract is expected to serve as a valuable demonstration to landowners of the vicinity.

◆

The public schools of Republic, Marquette County, Mich., are reforesting a 40-acre tract of cut-over and second-growth timber land presented to them by Henry Ford.

◆

The University of California reports registration of 13 graduate students in its division of forestry in the fall semester of 1929. The division's total registration for the semester was 70.

Boy Scout trail building in Glacier Nationa will be continued in the coming summer by 60 Scouts from New Jersey, Washington, and many between. In 1925 a band of 19 eagles left their on the Glacier in the shape of a trail in Two Me Pass, and for three successive summers work ha carried on in the St. Mary Lake region. In 19 eagles from 17 States built about 4,700 feet of Men employed by the National Park Service dire boys' work and do the necessary dynamiting.

◆

The establishment of shelter belts on North D farms was continued in the spring of 1929 wit planting of 155,000 trees under the direction o State extension forester and the State forester. 260 plantings made 160 were demonstration s belts and 40 were additions to shelter belts previ established.

◆

The Argonne School District, in Forest Co Wis., has received 120 acres of cut-over land school forest as a gift from the Chicago & N Western Railway Co.

◆

Motion pictures of the Okefinokee Swamp of Ge are included in a forestry news reel prepared by W McCormick for use in connection with the sout forestry educational project. The reel also records Georgia Forest Fair of 1929.

Forest Service Notes

Douglas Fir Seedling Mortality Heavy on Plots Without Shade

Ten days was the lifetime of Douglas fir seedlings that germinated on a plot of fire-blackened soil, without shade, studied in 1929 by the Pacific Northwest Forest Experiment Station. Seedlings grown on an adjacent unshaded plot with a specially prepared yellow mineral soil surface suffered a mortality of 89 per cent during the season.

The study area was in the Wind River Valley of Washington. Seedlings germinated on the two plots in the period May 13–17. On the first hot day of the season, May 20, with an air temperature of 89° F., the surface temperature of the charcoal soil rose to 143° F. and killed 47 per cent of the seedlings, while on the yellow soil a surface temperature of 125° F. caused no seedling loss. After two more days, with air temp tures of 85° and 89° respectively, all the seedling the black soil were dead. The extreme heat at the surface had cooked their stems. On the yellow soil loss in the same period was 16 per cent.

During the fourth day, when the air temperat reached 83°, the loss of seedlings growing on yellow mounted to 32 per cent. A later loss of 10 per cent attributed to after-effects of heat injury suffered du this 4-day period. A month without critical temp tures allowed the surviving seedlings to harden to s a degree that a soil temperature of 147° on July 30 parently resulted in no deaths from heat inj During the season this group sustained further lo of 5 per cent attributed to damping off, 16 per cent fr insect attack, and 26 per cent from drought, leavin survival on October 1 of 11 per cent.

Improved Plan for Estimating Range Utilization

By R. R. Hill, United States Forest Service

est officers responsible for the administration of nal forest range lands are working out a new od for making estimates of range utilization, gh which they hope these estimates will gain y in uniformity, orderliness, and accuracy.

the end of the grazing year each forest ranger district includes range land is called upon to t to what extent the forage on each grazing allot- under his charge has been overgrazed or under- d. Such reports form the basis upon which es are made in the numbers of stock admitted to lotments, in distribution of stock, and in methods hich the stock are handled; therefore the accuracy rangers' estimates is a matter of great importance. razing manual gives no definition of proper utili- n that is sufficiently detailed to serve as a guide in anagement of specific types, stating merely that eneral rule from 10 to 25 per cent of the palatable ation should be left at the end of the season. The mination of what constitutes 10 to 25 per cent of alatable vegetation on a given area remains as a ult problem for the forest ranger and the range ctor. In general, each forage type is made up of s varying greatly in palatability. One of the objectives of range management is to maintain nportant plants of high palatability. Obviously, the more palatable plants have been grazed as as they should be, a considerable quantity of the alatable forage remains unutilized. Consequently cial definition of proper utilization must be set up ach important forage type. Further, this defini- must be modified to meet local requirements in d to protection of timber reproduction, of soil and rsheds, and of wild life and recreational resources. er the percentage to which each important plant es should be grazed has been determined, the next lem is to define an accurate and practical way of ling when the specified utilization has been ned. The method generally in use at present sts in an ocular estimate by the ranger, checked by his own judgment. Experience has shown that t officers' opinions are apt to differ widely as to constitutes proper utilization and as to the degree tual grazing use.

e present proposal is for the forest supervisor and e inspector to develop a formula which will indicate ach important forage type the quantity of available produced by each plant species in the average year the quantity that should be left at the end of the ing year. (Average yearly forage production is e the standard because all carrying capacity estimates are based on average production.) Provision is to be made for the ranger to enter his estimates as to the average quantity of each forage species actually left at the end of the grazing year, and as to the percentage by which the current year's forage crop exceeds or falls short of the normal. By comparing actual utilization as estimated by the ranger with proper utilization as estimated by the supervisor and inspector, the degree to which the forage has been overgrazed or undergrazed can readily be determined.

Important forage species	Average height of plant or length of stem growth in average year (inches)	Average portion of plant left on range				Per cent of total forage which plant represents	Per cent of total forage left on range	
		Proper		Current year				
		Height (inches)	Per cent of total growth of plant	Height (inches)	Per cent of total growth of plant		Proper (4) x (7)	Current year (6) x (7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Aristida fescue	14	10	71	12	86	40	28	34
Mountain muhlenbergia	18	7	40	10	55	30	12	16
Senecio serra	30	----	20		25	5	1	1.2
Mertensia ciliata	24	2	8	4	17	5	.4	.8
Cercocarpus parvifolius	10	3	30	2	20	5	1.5	1
Total						85	43	53

Utilization—per cent under (−) or above (+) proper, −10.
Current forage crop—per cent under (−) or above (+) normal, +15.

It is believed that the use of the formula described involves no step that is not taken in connection with methods now in common use to determine carrying capacity of range lands and to judge range utilization. No forest officer, for example, would attempt to estimate the amount of forage available on the range without mentally listing the important species and roughly classifying them as to palatability. Comparisons of the current year's forage production with normal production, such as are made each year by every ranger having charge of range lands, predicate a definite mental image of the size to which the average plant of each species grows in an average year. Likewise, under present practice each ranger in making out his annual forage utilization report must have a definite conception of the average size that the ungrazed specimens of the important species attained during the current year and of the average amount of forage of each species left at the end of the year. The formula merely arranges the necessary processes in orderly fashion and provides for recording estimates in definite mathematical terms.

Is the Wet Lightning Storm a Worse Fire Starter than the Dry?

By H. T. Gisborne, United States Forest Service

Five years' records of about 300 observation stations in the northern Rocky Mountains have been sifted by the Northern Rocky Mountain Forest Experiment Station in an effort to determine the prevalence of dry lightning storms in that region and the relative tendencies of dry and wet lightning storms to cause forest fires. The station obtained and tabulated 14,754 reports of lightning storms, of all types, that occurred in the region in the period 1924–1928, inclusive. The reports came from lookout stations well distributed throughout northern Idaho and western Montana, on both sides of the Continental Divide.

In these records a storm was classified as dry if no rainfall reached the ground under the storm cloud either simultaneously with or directly before or after the occurrence of lightning.

Of the total 14,754 reports 1,238, or 8.5 per cent, were of dry storms. By seasons the proportion of dry storms was as follows: 1924, 7.3 per cent; 1925, 7.8 per cent; 1926, 6.4 per cent; 1927, 8.8 per cent; 1928, 9.6 per cent.

The question as to whether the lightning storm caused fire was definitely answered in 8,408 of the total number of reports. Of this number 825, or 9.8 per cent, stated that the storms were dry. Of these dry storms approximately 32 per cent were reported to have started fires.

The surprise in the study of this group of the reports arose when the proportion of dry storms that caused fire was compared with the proportion of wet storms that did so. Whereas fire resulted from 32 per cent of the dry lightning storms, it resulted from no less than 34 per cent of the wet storms. In considering this finding, contradictory of so much that has been said and written about the fire-causing tendency of dry storms, attention must be given to factors in the causation of fire by lightning that are not represented in the simple classification of storms as wet or dry. The data on which this comparison is based do not distinguish heavy rainfall from rainfall so light as to be quite ineffective in preventing fires; neither do they make distinctions as to whether lightning flashes were many or few or as to whether most of the lightning flashes were confined to the clouds or struck from clouds to earth. Meteorological records show that large clouds in turbulent action generally produce more lightning than smaller, thinner, and less active clouds, that they precipitate more moisture, and that the moisture they precipitate has a greater chance of reaching the ground. Thus it may be partly because dry storms have fewer flashes reaching the ground that in the complete lookout reports covered by this study dry storms showed approximately the same fire-causing percentage as wet storms.

New National Forest Created in Flo

On January 1 the Osceola National Forest cam
existence through Government purchase of 93,000
of land in northern Florida. The whole of this are
purchased from the Columbia Farm Lands Corpor
at $5 per acre. The new forest is located just no
Lake City. E. W. Hadley, assistant supervisor o
Ocala National Forest, Fla., has been made supe
of the Ocala and of the Osceola and will admi
both forests from headquarters in Lake City.

The Osceola Forest consists largely of longlea
slash pine areas, which are interspersed with
cypress swamps. Most of the pine lands have a
stand of reproduction and some older trees that w
a few years will be ready to be worked for turpe
The cypress swamps contain a considerable qua
of timber; 28,000,000 feet of large cypress is al
under timber sale contract. For this reason the f
will show good receipts from the beginning. O
whole, the area is an exceedingly valuable one fo
demonstration of good forestry practices in
southern pine region.

Certain areas adjacent to the land already purc
are being examined with a view to enlarging the f
to 150,000 acres.

Loud Speaker Shows Promise as Protection Tool

Loud speakers operated from airplanes may pr
valuable means of communicating fire warning
forest visitors and of directing men on the fores
line, according to the results of tests carried out
summer on the Angeles National Forest, Calif.
loud-speaker outfit used in the tests was a small
weighing about 65 pounds. Messages spoken th
it were heard to good advantage when the plane
from 900 to 1,100 feet above the auditors; at an e
tion of 900 feet they had a side range of 1,000
With a larger instrument, it is estimated, mes
could be communicated effectively over an area a
2,000 feet in diameter from a plane at an altitu
about 1,500 or 2,000 feet. The usefulness of the
speaker in connection with fire-suppression
would of course be limited by the danger involv
flying a plane low enough to talk to crews wo
near the bottoms of deep canyons.

◆

National forest receipts during the second ha
1929 amounted to $3,245,164, exceeding those o
same period of 1928 by $316,053. Timber
brought in $2,405,829; livestock grazing fees, $625
permits for special uses of land included in the fo
$120,168; and water-power permits, $58,042.

Farm Forestry in the Movies

w to handle farm woodlands for profit is shown in -reel motion picture titled "New Woods for Old," tly produced by the Forest Service and Extension ce, United States Department of Agriculture. onger should the owner of a tract of woodland upon it only as a source of firewood or as a hunt- round, the picture teaches; for, with right manage- , woodlands can be made a steady source of profit. , it is pointed out, the owner should know what of timber he has and how much. To this end he d learn how to use a "cruising stick" and estimate anding timber. Knowing what he has to sell, he d advertise for bids and sell to the highest reliable r, under a written contract that safeguards his ests. The contract should provide for the cutting of the trees marked by the owner, who will have ted the mature and overmature, crooked, diseased, spreading trees and those of poor timber value. nger, vigorous trees of the better species will be o form a new and more valuable stand from which ional timber crops may be harvested in the future. contract should provide, also, for supplying the r's lumber needs at the cost of manufacture. The re shows Wendell, the owner of a tract of eastern wood in Maryland, following these simple rules happy results for himself and his family.

ends of Man, a four-reel motion picture recently sed by the Department of Agriculture is the latest ribution of the Forest Service to the educational paign against woodsburning. The "friends of " are the trees that will grow as a profitable crop therwise idle land if given protection from fire. picture points out in an arresting manner the sirability of the "burning off" practice from the dpoint of good farm management. Friends of was filmed near Wilmington, N. C., and its story rticularly applicable to the Southeastern States. picture is intended as a companion piece to Trees ighteousness, filmed several years ago in Arkansas, like it has a melodramatic tinge. It was prepared arily for use on Forest Service motion-picture ks operated in remote districts where motion ures are seldom seen. Thrills are supplied by a s of spectacular shots of a real forest fire.

ese films may be borrowed free of charges, other the cost of transportation, by application to the e of Motion Pictures, United States Department griculture, Washington, D. C.

* * *

t areas of the 150 national forests of the United es, compiled as of June 30, 1929, totaled 159,750,- acres. The increase in the total within the year ng on that date was 269,664 acres.

National Forest Roads and Trails

In the year ending June 30, 1929, $9,662,212 of Government funds and $1,523,232 of cooperators' funds was expended on construction and maintenance of national forest roads and trails. The year's construction work added 2,013 miles of roads and 7,453 miles of trails to those previously in existence as part of the national-forest system. The Bureau of Public Roads built 276 miles of major roads at an expense averaging $21,197 per mile; the Forest Service built 1,737 miles of minor roads with an average expenditure of $1,233 per mile. Trail construction by the Forest Service was considerably less expensive than usual, costing $139 per mile as compared with an average cost to date of $175 per mile. The year's maintenance bills, which exceeded those of 1928, were $529,622 for major roads, $765,205 for minor roads, and $415,949 for trails.

On July 1, 1929, the completed portion of the national forest road and trail system included 17,422 miles of roads and 62,275 miles of trails. It represented a total investment of $100,798,664 for construction, improvement, and maintenance. The projected system, which according to plans approved by the Secretary of Agriculture should be completed by July 1, 1938, includes 15,332 miles of major roads, 45,799 miles of minor roads, and 131,087 miles of trails.

How Much Rainfall Reaches the Forest Floor?

Measuring spring and autumn rainfall on the forest floor at two stations in northeastern Wisconsin, foresters of the Lake States Forest Experiment Station in 1928 found that only 78.5 per cent of the total rainfall reached the ground under a stand of jack pine and that only 81.7 per cent penetrated the canopy in a forest of hardwoods and hemlock. The hardwood hemlock forest canopy let through only 75.4 per cen of the rainfall in the spring, when the hardwoods we in leaf; in the fall, when the hardwoods had shed the leaves, the proportion rose to 84.5 per cent.

* * *

Important conifers of the Northwest are describe biweekly press releases which the Portland, Oreg., fice of the Forest Service is sending out this year to schools in its territory. Each release deals with species, telling "what the tree looks like, how it where it is found, and what it is good for." The rial is suitable to be published in school papers, u English classes, posted on bulletin boards, or pla reference in libraries. This is the sixth year in the Portland office has distributed a series o stories to high schools.

General Forest News

Spruce Bud Worm Attacks Lodgepole Pine

By. R. E. Balch, United States Bureau of Entomology

Not only does the spruce bud worm feed and prosper on many conifers other than the spruces, but it gives evidence of being able to alter its diet and even its food preferences to suit circumstances. The latest addition to the list of its victims is the lodgepole pine.

In the Northeast, where it has done its greatest damage, this insect shows a distinct preference for balsam fir. This is doubtless due to the fact that the fir affords suitable food for the caterpillars throughout their period of development. On the spruce the insects can eat only the new growth; on the fir, after consuming the new foliage they easily feed on the old. Thus in this region the greatest damage by the spruce bud worm has occurred where balsam fir was most prominent in the stand.

The earliest intensive studies of the spruce bud worm were made in eastern Canada. Although these studies showed that the insect would feed on hemlock, larch, and pine, they did not disclose the possibility of its becoming epidemic elsewhere than in stands of spruce and balsam. A few years ago, however, an epidemic appeared on pine, chiefly Pinus banksiana, in the Lake States. Here the insect, found to be morphologically the same species as that attacking spruce and fir in the Northeast, preferred pine to either fir or spruce. In the West the bud worm has been known for some time as a serious enemy of Douglas fir, defoliating and killing large quantities of timber of this species, but until recently had not been found to infest pine, larch, or hemlock to any marked degree except where they were surrounded by Douglas fir. In 1928, however, a considerable infestation of the spruce bud worm was discovered in a pure stand of lodgepole pine around the southwest corner of Yellowstone Park. In 1929 this infestation covered 75 square miles.

Here the preferred host is definitely lodgepole pine. Although Douglas fir and alpine fir are scattered throughout the lodgepole, frequently surrounded by pines on which all the new foliage has been destroyed, the bud worm feeds on them in small numbers only. In fact a closely allied moth, Peronea variana, has done more damage to the fir and spruce in this district than has the bud worm. In Cody Canyon, not 60 miles distant, Douglas-fir timber is being killed over a large area by a race of the bud worm that consistently avoids the lodgepole pine so long as it can obtain fir.

Two distinct biological races seem to have appeared in these two closely adjacent localities, with host preferences adapted to the type of stand in which they exist. Superficially they are the same in appearance, although the insect which feeds on lodgepole is invariably smaller. (Busck has named the latter Cacoecia fumiferana var lambertiana.) While in nature these races, or varieties, do not appear to change t preferences readily, in the laboratory the in been forced to change from pine to fir in the larval stages and after doing so has comp development. It may be that when obliged t a new host for a number of generations tl acquires a preference for that host. If so, fu breaks on other conifers may be anticipated.

On Douglas fir the insect readily eats the the leaf, although in the earlier stages it neec tissue. It even attacks young twigs. When on pine it avoids mature tissue, even in the late possibly because the epidermis is too tough mesophyll unpalatable. Moreover, it feeds al clusively at or near the base of the needles, n hole through the bundle sheath to reach th This seems to be due to a preference for growin Owing to this difference the attack is much less ing to pine than to Douglas fir; on normal pin or more years of concentrated attack will be r to effect complete defoliation.

On the lodgepole pine area little mortal occurred until after the third year of attack, a in many cases leaders have been killed the fir Mortality is greatest in the dense, younger growth.

Artificial control of the spruce bud worm is d In Canada it is being attempted through the a tion of arsenical dust by means of airplane caterpillars' habit of spinning webs of silk arou foliage upon which they feed makes poisoning on fir, and still more difficult on pine since th of the needles are particularly hard to reach w poison. Parasites are becoming numerous, b expectation of control by natural means in tl future is purely speculative.

Blister Rust Control Operations of Cover 900,000 Acres in Ea States

White pine blister rust control operations of tl 1929 covered 919,755 acres in the New England and New York, including 131,492 acres on which control operations had been carried out prev In these States 158 towns contributed $41,323 year's work and 4,369 individuals contributed $ The cost per acre was 18.6 cents. Systematic work was begun in Pennsylvania during the yea the eradication of Ribes from 4,877 acres.

Michigan in 1929 made use of its first blister-ru trol appropriation, protecting 2,378 acres of Sta ests and, with the cooperation of a town, 380 a other land. In Wisconsin the lack of funds limite trol work to 120 acres of privately owned land.

he Boyce Thompson Southwestern Arboretum

arboretum higher and drier than most is under
opment a few miles west of Superior, Ariz. It is
bject of William Boyce Thompson, who founded
Boyce Thompson Institute for Plant Research at
kers, N. Y. About 2,000 acres of land at an eleva-
of approximately 2,600 feet has been set aside as
Boyce Thompson Southwestern Arboretum, with
oses which the founder has described as follows:

> another century this country must feed, clothe,
> shelter several hundred million people instead of
> 00,000 as now. We are to help get ready to do
> I have in mind far more than botanical plant
> agation. I hope to be able to benefit the State
> the Southwest in the addition of new products.
> rly everyone outside her boundaries appears to
> rd Arizona as a desert land. In reality she has no
> desert. * * * Her plains have as much
> l life as there is anywhere on earth. Nothing can
> reener than an Arizona winter, with its decking of
> iads of wild flowers. To her indigenous plants,
> bs, and trees I am planning to add every plant that
> grow here. There will be the creation of a plant
> ction that will be of interest to the nature lover
> the plant student, but we are going to stress the
> tical side and see if we can not obtain results that
> make these hillsides and canyons far more produc-
> and of far more benefit to man than they are at
> ent.

lants and trees that are native to Arizona, Nevada,
v Mexico, California, and Texas will be studied
nsively at the arboretum and experiments will be
le in introducing species that grow in arid and
iarid conditions in foreign lands, including Austra-
Africa, South America, Southern Europe, the West
ies, and Mexico. Some plants are to be maintained
ler natural conditions so far as rainfall is concerned,
see what results can be obtained through culture and
tection from natural enemies. Others will be
gated to determine the possibilities of greater devel-
nent of plants the vigor of which has been established
ough centuries of growth in arid conditions.

n the five years since the arboretum was established
ive work has been begun on a comparatively small
a. In a sheltered valley close to the State highway
ween Phoenix and Globe buildings have been
cted for laboratory and propagation work and for
titution headquarters. Water is pumped to the
oretum reservoir from a well in the Queen Creek
lley. Seeds and plants brought in from many
ts of the world are started under glass in the propa-
ion rooms and transplanted thence to lath houses,
ere they are carefully watched and tended in prepa-
ion for planting in the field. With trees and plants
t have been graduated from the propagation house
interesting canyon garden has been developed.
re trees of possible value for shade or for fruit are
erspersed with plants that are expected to prove valuable as ornamentals. Labels acquaint the visitor with the names of the species.

An important feature of the work being carried on at the arboretum is an especially elaborate study of root growth.

F. J. Crider has charge of the arboretum, with Fred Gibson as his assistant. In planning the work of the arboretum he has had the advice of William Crocker, director of the Boyce Thompson Institute for Plant Research. Cooperative relations have been formed with several institutions of learning and research, particularly with the University of Arizona and the Office of Foreign Plant Introduction of the United States Bureau of Plant Industry. The Forest Service is cooperating, through its office of range research, by furnishing the arboretum with seeds of promising native plants and plans to make field tests on the range of those plants which prove of practical value in the experiments at the arboretum.

The arboretum was formally dedicated in April, 1929.

Nucleus of Great Smoky Mountain National Park Ready for Government Administration

The States of North Carolina and Tennessee have notified the Secretary of the Interior that they are ready to turn over to the Federal Government 150,000 acres of land acquired for the purpose of establishing the Great Smoky Mountain National Park. The law providing for the creation of the Great Smoky Mountain National Park set 150,000 acres as the minimum that the Government would accept as a nucleus of the proposed park. The Government agreed to take over this area for administration and protection pending purchase and presentation by the two States of the greater part of the remaining available park land in the Great Smoky Mountain district. When the additional area, of more than 277,000 acres, is presented the Government will proceed with actual development of the park.

The two States have raised nearly $5,000,000 to be used in purchasing land for the park, and the Laura Spellman Rockefeller Memorial has pledged a contribution not exceeding $5,000,000.

⁂

The International Pulp Co. is reported to have succeeded in reforesting about 250 acres of land near Fullerville, St. Lawrence County, N. Y., that was formerly almost devoid of tree growth and covered with blowing sand. Northern white pine and Norway pine have been used in the planting, which began abou
15 years ago. The blowing of the sand has bee
eliminated and the road through the area, which w
formerly impassable most of the year, is now passab
at all seasons.

Meeting of Society of American Foresters

Convening at Des Moines, Iowa, on December 30, for its twenty-ninth annual meeting, the Society of American Foresters devoted a day to discussion of different aspects of national forest policy and another day to technical papers and society business. Wilson Compton, manager of the National Lumber Manufacturers Association, presented the view that the consumption of forest products in this country may reasonably be expected to decline in such a degree as to eliminate danger of a timber famine. This theory was opposed by Earle H. Clapp, assistant forester, United States Forest Service, on the basis that the South and the West Coast are the only sections of this country now exporting forest products and that Eastern and Middle Western States are importing heavily. Mr. Clapp emphasized, also, the need of forests for purposes other than timber production, including recreation, flood control, erosion control, and restoration of fertility to worn-out soils, and the fact that for an enormous acreage the alternative to forest production is idleness.

Page S. Bunker, State forester of Alabama, discussing the idle-land phase of the national forest problem, expressed the feeling that this should be met through private initiative rather than through Government action. H. H. Chapman, professor of forest management in Yale University, in discussing Mr. Bunker's paper questioned many of the assumptions which he found expressed in it, such as that forest production must pay, as a separate business enterprise, on the same basis as other business ventures regardless of its function in providing raw materials for industry, that public forestry is certain to be a dangerous competitor to private forestry, and that public business is in its very nature less efficient than private business.

The desirability of extension of public forests was discussed by Henry S. Graves, dean of the Yale School of Forestry, and plans of the Federal Government for acquisition of lands for national forest purposes were outlined by L. F. Kneipp, assistant forester, United States Forest Service. Mr. Kneipp stated that to date 32 separate units within 17 States have been designated for purchase, within which it is planned, if possible, to acquire 6,100,000 acres of land in addition to what has already been acquired. Land otherwise owned or already acquired as national forests and areas already approved for purchase for national forest purposes total 5,954,131 acres. In addition, Mr. Kneipp said, it is desirable that about 23 new units be designated, in which approximately 3,300,000 acres should be acquired. Mr. Kneipp proceeded to define the land-acquisition policies of the Forest Service.

A paper contributed by W. B. Greeley, manager of the West Coast Lumbermen's Association, discussing the problem of stabilizing lumber production in that region, introduced the idea that it might be in the interest of the public as well as of the industry that the manufacturers be authorized to act collectively for trol or regulation of their production. Mr. Gre suggested the possibility of a Federal board on nat resources authorized to approve, disapprove, or m any plans of this sort proposed by the industry. colm Sharp, professor of law in the University of consin, analyzed Mr. Greeley's suggestions and pressed some doubts as to the legality of any such lective action designed for the immediate purpos restricting production.

The technical papers presented were Dissectio Wood Fibers by Chemical Means, by George J. Ri chemist, Forest Products Laboratory; Environme Control for Game Through Modified Silviculture, Aldo Leopold, in charge of game survey, Sporting A and Ammunition Institute; Some Influences of Forest in Erosion and Water Control, by W. C. Low milk, silviculturist, California Forest Experi Station; and Some Problems in Silvicultural Resea by Willis M. Baker, associate State forester, Jersey. Hon. L. J. Dickinson, chairman, subc mittee on agriculture, Appropriations Committe the House of Representatives, described the attit of this subcommittee on forestry matters.

Dean Graves reported on the progress of the socie forestry education study, through which it is hope arrive at some definite conclusions as to what sor training is needed by men entering the forestry pro sion and as to how the schools may give such train C. H. Guise, who is assisting Dean Graves in project, described the investigation he is making o the forest schools in the country. This investiga includes in each case a study of the students and t motives, the education and experience of faculty m bers, the school's equipment and backing, and teaching methods in use.

It was announced that a prize of $1,000 anonymo given to the society to be awarded for a paper dea with the solution of the nation's forest problem been awarded to Ward Shepard, of the United St Forest Service.

Paul G. Redington was reelected president of society. Other officers for the current year are J D. Guthrie, vice president, and Morgan Pryse, se tary-treasurer.

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Another petrified forest, the only one so far discove with the trees lying as they fell millions of years is reported by the United States Bureau of Recla tion. It was found by a road-building expedition the lower Yellowstone reclamation project, ab three miles southwest of Savage, Mont. The petri forest covers several acres. Some of the trees are feet in diameter and more than 100 feet long. T all lie with their tops pointing in the same direct indicating that they may have been blown down b storm.

remes of Temperature Fatal to Western Pine Beetle

By J. M. Miller, United States Bureau of Entomology

ery cold weather is fine weather for the entomol- in regions infested with the western pine beetle. as been found that low temperatures may kill eciable proportions of the broods of this insect r field conditions. In 1924 control work on the olius project near Bend, Oreg., was begun soon a cold spell in which temperatures in the vicinity end reached minima of 20° to 25° below zero F. . Jaenicke, who started the spotting work, soon d that to burn the bark of infested trees would be a e of effort, because a high percentage of the broods ne outer bark were already dead. Control work abandoned, and in the following season the intion subsided. No explanation of the high mory of the broods was discovered other than the e cold.

nce 1926 the Bureau of Entomology has been ying on a series of laboratory experiments to obtain on the susceptibility of the western pine beetle w temperatures. By means of special freezing ratus infested bark has been exposed to low eratures ranging to 20° below zero F. When e overwintering on western yellow pine areas at r elevations in the region of the Sierra Nevada ntains were artificially subjected to low temperasome of them died at zero F., less than 30 per survived a temperature of −5° F., and complete ality resulted from a temperature of −10° F. nant as well as actively developing larvæ suced without exception to this range of tempera-. Pupæ were killed by less extreme degrees of they showed high mortality between 5° and −5° nd complete mortality at −8° F. Adults showed less resistance; their mortality was high between nd 5° F., and at zero F. it was complete. Eggs he cambium) showed greater resistance to cold any other stage; although some of them lost ity between 5° and −10° F., about 10 per cent ined fertile after exposure to a temperature of ° F.

oods from Coeur d'Alene, Idaho, showed greater tance to cold than those from the milder climate of Sierra Nevada region, about 25 per cent of the e surviving a temperature of −10° F. although ality was complete at −18° F.

der field conditions, bark temperature does not o a point that means death to the western pine e until air temperature has fallen considerably that point. The outer bark of standing trees more slowly than the surrounding air. Records by J. C. Evenden and H. J. Rust at Coeur ene, Idaho, during two short periods of subzero her indicate that minimum bark temperatures were 10° to 12° F. above minimum air temperatures. This difference accounts for the fact that western pine beetle infestation occurs on western yellow pine areas in regions where winter weather is severe. However, the worst epidemics seem to have developed in regions where long periods of subzero weather rarely occur.

This relation of bark temperatures to air temperatures can be made to work against the western pine beetle in the summer season. Under conditions of clear summer weather, with air temperatures ranging from 80° to 95° F., bark removed from the log and placed on the ground with the inner surface exposed to direct sunlight will reach maximum temperatures of from 110° to 130° F.; and complete mortality of the beetle is assured if bark temperatures stand at 115° or 118° F. for a period of two hours. Removing infested bark and exposing it to direct sunlight can be used as a control method to supplement the general practice of burning infested bark during the fall, winter, and spring.

Sodium Chlorate as Plant Poison Endangers More Than Plants

By W. A. Dayton, United States Forest Service

In view of the considerable interest aroused during the past three years in sodium chlorate ($NaClO_3$) as a means of getting rid of objectionable weeds and poisonous plants, an interest that has been evidenced by a long succession of bulletins and other papers dealing largely or exclusively with this subject, it may be well again to emphasize the fact that this chemical is a very dangerous one. Although it is undoubtedly efficacious in destroying undesirable vegetation, in general its use for this purpose on forest and range is attended by very great danger of fire and of injury to man and beast. Its use under safeguards in such places as forest nurseries is, of course, another matter. Formerly this salt was held by some authorities to be harmless; but this theory is contradicted in a recent leaflet of the Bureau of Plant Industry entitled "Chemical Weed Killers," by M. W. Talbot, and in a recent bulletin of the Washington Agricultural Experiment Station entitled "Eradicating the Bindweed with Sodium Chlorate." In the latter publication Messrs. E. G. Schafer, O. C. Lee, and J. R. Neller state unequivocally that "sodium chlorate has a poisonous effect upon livestock if taken internally, although it is not so deadly as arsenic." The danger that the use of this chemical on the range will result in livestock poisoning is intensified by the fact that vegetation treated with it retains a salty taste which attracts the stock. In addition, the chemical is so combustible that the mere friction caused by persons or animals walking through vegetation so treated has been known to cause explosions and severe fires. All in all, so far as forest and range are concerned sodium chlorate seems to be a pretty good thing to "lay off of."

Weather Conditions a Factor in White Pine Weevil Injury

By H. J. MacAloney, United States Bureau of Entomology

Weather conditions have a marked influence on the prevalence of white pine weevil injury, the Bureau of Entomology has found through its studies of the activities of this insect in the Northeastern States. Weather phenomena affect not only the development of the weevil from the time the egg is laid but also the resumption of spring activity by the hibernating adults; furthermore, local weather conditions during the hibernating period influence noticeably the chances of successful hibernation. When a wet autumn and an open winter, with great and sudden changes in temperature and rainfall and a subnormal quantity of snow, are followed by a backward spring, many of the hibernating beetles are killed. This is what happened in New England in 1927–28.

Weather Bureau reports for the period October, 1927–May, 1928, show that snowfall was below average until the first of March and above average from then until early April. Total precipitation for the period was above normal. Temperatures averaged above normal until the first of March and below normal from then until June. Over a period of years white pine weevil attack had been gradually increasing in the New England States, but in the spring of 1928 the increase was checked. In some sample plots a slight increase occurred; but over the region as a whole the infestation did not increase, and on some sample plots it decreased very noticeably.

The following season told another story. Weather records for the period November, 1928–May, 1929, show that November and December were warm and dry. Snowfall was less than average until January 1, but from then almost to the beginning of spring the ground was blanketed with snow. March was warm and wet. April had a little more than normal snowfall. May and June were warm, and vegetation developed less slowly than in the previous season. In 1929 v attack, instead of repeating the decrease of 1928 exceptionally heavy. Data from sample plot re indicate that there was a greater amount of wee in New England, and also in New York, in the s of 1929 than in any other year for which the B of Entomology has records. Ordinarily the devel larvae of the weevil kill only two years' growth; in the development of unusual numbers of larvae indicated by the fact that the number of leaders l back three or more years was the greatest ever obse

Naval Stores Factors Oppose Premat Tapping of Southern Pines

In efforts to discourage premature tapping of sout pines for naval stores production the United S Forest Service enjoys strong support from the N Stores Factors Association. Forest Service ex ments have shown that if a tree is to produce maximum lifetime yield of resin it should not be ta until it has attained a breast-height diameter inches. Members of the factors' association are vising their customers to observe this minimum, are punctuating their advice by giving away 5 veneer tree gages having a 9-inch opening. Al 1,000 of the gages have been distributed. Morec naval stores factors of Florida have discarded thei lease form and adopted one incorporating the requ ment that no trees less than 9 inches in diamete breast height be tapped.

* * *

T. B. Mathewson, superintendent of Godd Memorial Park, Warwick, R. I., reports success establishing a protective growth of pines on w swept sand dunes at the park. After much difficult saving his newly-planted pine seedlings from be buried alive by the sand, Mr. Mathewson found t a 2 to 3-foot stake driven into the ground on windward side of each seedling breaks the wind checks the drift of the sand sufficiently to allow little tree to get a start.

Foreign Notes

Mexican Forestry Congress

The Mexican Forestry Society (Sociedad Forestal Mexicana), in cooperation with the Forest Service of Mexico, has arranged for a national forestry congress at Mexico City February 14–22, 1930. Owners of forest land, persons interested in the exploitation and manufacture of forest products, foresters, farmers, stockmen, representatives of municipalities, and all others interested have been invited to attend. The purpose of the conference is to discuss the forestry situation Mexico and to crystallize ideas regarding desira forest policies, as a preliminary to the Inter-Ameri Conference on Agriculture, Forestry, and Ani Industry to be held at Washington later in the ye Topics on the program include: National forests, St forests, national parks, communal and municipal fore private forests, protection of forests and ranges agai fire, protection against insects, forestry education, forestation and correction of torrents, forest statist economic and fiscal problems, and forest legislation.

v Seed Selection Forced its Way into European Forestry

By E. N. Munns, United States Forest Service

ıring the eighteenth century the question of ship
ers was a live one among the maritime powers of
lay. Most of the European powers, having no
amount of first-quality pine timber of their
close to the sea, went to the Baltic for special
s obtainable there. The transportation of such
nodities was a risky thing, however, especially
mes of international friction, and had the additional
l handicap of the tribute exacted by the Danish
s. This demand of tribute apparently irked France
ially, for we find that she imported Baltic seed and
npted to grow pines of northern quality on her own
This seems to have been the first European
npt to use selected seed for reforestation purposes.
r England gave special consideration to the ques-
of supplies of desirable oak, but it is questionable
the English ever practiced extensively the plant-
of acorns from trees selected as having the desired

ıte in the eighteenth century Darmstadt, in Hesse,
me a forest tree seed center. Aside from the fact
the climate permitted air drying of the cones, just
this happened does not appear to be known.
sia and Sweden were among the early foreign buyers.
ı them seed collection was impossible because the
hern climate was too cold and damp for natural
drying.

arly in the nineteenth century Swedish foresters
d that they were getting unsatisfactory results with
German seed. While the early growth was good,
as often caught by either late spring or early fall
ts. Besides, the later growth rate was below that
ıe natural stands, and the stems were not so straight
hose of the native product. Indeed, some pine
ıtations failed at from 30 to 50 years of age, causing
siderable anxiety as to the development of the
ıting program. It appears that spruce, also, became
ased and died at early ages.

onfronted with these conditions, the Swedish
est Service stopped all planting of stock from
ign spruce and pine seed on the State forests and
ed warnings to private owners as to the losses
ly to result from such planting. Then, in order
vercome the lack of natural facilities for drying
es, the Swedes developed seed-drying kilns. Still,
l was expensive and was difficult to obtain in the
ntities desired. Consequently pine seed from
thern Germany and spruce seed from the Hartz
untains continued to enter Sweden. To reduce
ortations Sweden placed a duty of about 6.5 cents
pound on the seed. This duty has been increased
n time to time. As an aid to the local dealers the
vernment requires that all imported seed be stained,
l sold as foreign seed.

In Germany the results of using cheap tree seed manifested themselves less promptly, because the climate was warmer and the season longer than in Sweden. The need for cheap nursery stock had led the German seed collectors to the dune region of France and Belgium, where seed was borne nearly every year on low, crooked trees from which it could readily be gathered. In time the Germans in the great inland plain realized that they too were incurring troubles by using poor seed. These troubles were the more marked because of the fact that Germany was developing a clear-cut-and-plant silviculture. In 1910 the Union of German Seed Dealers was organized with the policy of collecting good seed and guaranteeing it as such. Since then there has been created the Prussian Seed Control Station, at Eberswalde, supported at least in part by the State. Now a Prussian forester, before he may sell seed, must have had his stand examined by an official committee and received from the committee a bill of health as to the quality of his forest. The rating of a forest by this seed committee is a formidable affair; not only is the Prussian State Government represented but also the association of forest land owners, the Prussian society of professional foresters, and the seed dealers. The forest is examined not alone as to its health and growth rate, but with respect to every other factor that might influence the quality of the seed. Samples of the seed are sent to the seed control station for testing as to purity and germination.

Seed from native pine forests of the best quality now commands in Germany a price premium of from 30 to 100 per cent over the French and Belgian seed. So valuable is the certified seed crop from selected trees that foresters wishing to sell seed have worked to develop large groups of trees of uniform size, in which they allow no poorly formed tree to remain. Any tree that appears not to be a seed producer is removed at the first opportunity, because such trees reduce the possibility of the forest receiving a high rating that may enable it to bring in some very welcome intermediate revenues.

Southeastern Ontario Conditions Permit Successful Field Planting of Tree Seedlings

Early results in a planting experiment under way at the Petawawa Forest Experiment Station, in southeastern Ontario, give evidence that the climatic and soil conditions existing in that locality make it possible to transfer planting stock from the seed bed directly to the field with results no less satisfactory than those obtained when the stock is given an intermediate period in transplant beds. In this experiment white spruce has been used as a representative pulpwood species and Norway pine as a representative lumber species.

One of the plots on which the experimental plantings were made is situated on a damp, low-lying area; the other is on dry, sandy loam in an open abandoned field having a slight easterly slope. On the first plot 12 subplots, each 100 feet square, were planted to spruce; on the second, 6 subplots of this size were planted to spruce and 12 to Norway pine.

All plantings of each species were made with trees from the same lot of seed sown in the same nursery in the same year. Plantings made in the spring of 1924 were 2-year seedlings direct from the seed beds, and those made in 1925 were of 3-year seedlings direct from the seed beds; the plantings of 1926 were of trees that had spent 2 years in the seed beds and 2 in transplant beds.

During the rainy years 1927 and 1928 a considerable quantity of water lay on the first plot, particularly in the furrows. The ground cover on this plot consists of sod and tall grass, with patches of raspberry and blackberry bushes. It can reasonably be stated, says R. H. Candy, who reports the experiment in the Forestry Chronicle, that the young plants on this plot have had to compete with a considerable number of difficulties. The mortality on this plot has been about 25 per cent; its distribution leaves no reason for believing that any one class of plant has suffered more than another.

On the plot established on dry, sandy loam in an open field, the trees are subject to great competition from sod, tall grasses, and raspberry and blackberry bushes. During part of the summer many of the young trees are completely hidden from sight by the mass of competing vegetation. Mortality, however, has been negligible, amounting to not more than 5 per cent; it has been distributed fairly evenly over all the subplots.

During September, 1928, 50 trees on each subplot were mechanically selected and measured for height. It was found that for the wet site every subplot of trees that had been planted in the field as 2–0 and 3–0 stock showed an average height greater than that on any subplot of trees that had been planted as 2–2 transplants. The weighted average height of the 3–0 group was 21 per cent greater, and that of the 2–0 group was 43 per cent greater, than that of the 2–2 group. For spruce on the second plot the trend of the comparison was the same with the exception that one subplot planted with 3–0 seedlings had an average height slightly less than that of one subplot planted with 2–2 transplants; the weighted average height was 23 per cent greater for the 3–0 group and 66 per cent greater for the 2–0 group than for the transplant group.

Examination of the Norway pine subplots gave similar results, average height on each subplot planted to 2–0 or 3–0 seedlings being greater than that on any subplot planted to transplants. The weighted average heights for the 3–0 group and the 2–0 group were 15 per cent and 31 per cent, respectively, greater than those of the transplant group.

A report from the Lake Audy Nursery Station, I
Mountain National Forest, Manitoba, quoted b
Candy, states the conclusion that at that localit
cost of producing 3–0 seedlings is only one-fifth th
of producing 2–2 transplants and, according to r
from plantations established to date, mortality
2 per cent higher in 3–0 stock than in 2–2 stock.

Soldering Lamp for First Weedin Nursery Beds

The weeds that come up just ahead of tree see
in forest nursery seed beds have been succes
destroyed by means of a soldering lamp, repor
Misson in the Bulletin de la Société Centrale Fore
de Belgique. A layer of peat about 1½ to 2
meters thick is spread on the seed bed and is wa
well, then the heat of the lamp is applied.
destruction of this first crop of weeds permit
seedlings to come up in an absolutely clean be
postpones the necessity of hand weeding unti
trees are large enough to withstand it.

* * *

A jack pine sawfly infestation covering about 3
acres was discovered in June, 1929, in the Ki
Lake Region of Canada, according to a repo
Thomas D. Pickard, a member of the forestry
of the Canada Power and Paper Corporation.
infested area lies about 200 miles north of Ot
Evidently the sawfly has been working in the r
for several years, although it seems not to have
such great damage in any preceding year as in
The infestation seems to be moving eastward,
threatens the immense tracts of nearly pure jack
which lie near the headwaters of the St. Ma
River, 150 miles east of Kipawa Lake.

* * *

A new national park has been established by
Canadian Government in the Georgian Bay regi
Ontario. The park consists of 28 islands. Incl
among these is the 2,712-acre Beausoleil Island,
in addition to its attractions as a recreation are
historic interest as having figured in the triple
of St. Louis, fought in 1649.

* * *

The German Government's order of February,
prohibiting importation of seed or cones of pine
fir, has been modified to permit the Minister of
culture to allow exceptions. This order was is
because of poor results obtained from planting
ported seed without determining whether climatic
ditions of the site where the seed originated were
ilar to those of the planting site.

d-Dune Planting on the Island of Cyprus

27 years' time tree planting operations on the dunes of Cyprus have extended over 1,700 acres. rently the dune sands of Cyprus, unlike those d in many lands, contain sufficient quantities of ral salts to permit good tree growth. Artificial ring is necessary until the young trees establish selves. The principal species used in the planting wattles, Acacia cyanophylla and A. longifolia. former, which seems to be much more drought tant than the latter, is an excellent nurse tree for s halepensis and P. pinea. These pines are now being planted in rows alternating with rows of wattles. The black locust is proving satisfactory but is not so drought resistant as the wattles. For windbreak purposes the shrublike Dodonea viscosa is proving valuable.

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On the 6,000,000 acres of Poland's national forests less than 3,500 acres was burned over in each of the years 1923, 1924, 1926, and 1927. In only two years of the 7-year period 1921–1928 was the total as high as 8,500 acres. Because of drought conditions prevailing in 1929 it was expected that the area burned over during the year would exceed the previous high total of the decade, the 37,700 acres reported for 1920.

Personals

ul D. Kelleter, recently director of extension, New State College of Forestry, after a short period of ice as administrative assistant to the Federal Farm rd has accepted appointment as conservation ctor of Wisconsin. The duties of Mr. Kelleter's position include the administration, under the e conservation commission, of State forests and e parks and of fish, game, and other outdoor urces.

. M. Granger has been promoted from the position listrict forester, North Pacific National Forest rict, to that of head forest economist in charge of nation-wide forest survey that is being launched by United States Forest Service. Mr. Granger, a luate of the Michigan Agricultural College, has a series of administrative positions in the Forest vice, which he joined in 1907. During the World he served with the Tenth Engineers, attaining the of major. He has served as district forester since 5. The project he is now undertaking, which was horized by the McSweeney-McNary Act and for ch Congress has provided an initial appropriation $40,000 for the current fiscal year, is a compresive survey of present and prospective forest rerces of the United States and of the Nation's sent and prospective requirements of forest prods. Initial work on the survey is being begun in the ific Northwest. Mr. Granger's temporary headrters are at Portland, Oreg. C. J. Buck, assistant rict forester in charge of lands in the North Pacific tional Forest District, succeeds Mr. Granger as rict forester. Mr. Buck joined the Forest Service 1905, after receiving the bachelor's and master's rees from Williams College and the Yale School of estry, respectively, and has held the position which now leaves since 1910.

orace J. Andrews has been appointed senior forest nomist, United States Forest Service, and placed in rge of work on the forest survey project in the ific Northwest. Mr. Andrews leaves the position of ef fire warden, Michigan Department of Conserva. He is a graduate of the University of Michigan h the M. S. F. degree, and has served as a forestry instructor in the New York State College of Forestry, the University of Michigan, and the Iowa State College. He is credited with an important part in the development of the Michigan land economic survey. In his new position Mr. Andrews is stationed at the Northwestern Forest Experiment Station, Portland, Oreg.

Robert W. Cowlin, who specialized in economics in the forestry department of the University of California and has had several years' experience in connection with lumber operations, has been appointed associate forest economist in the United States Forest Service and assigned to work on the nation-wide forest survey, with headquarters at Portland, Oreg.

D. N. Matthews has been promoted from the position of assistant supervisor of the Umpqua National Forest, Oreg., to one on the forest survey staff at Portland, Oreg. Mr. Matthew's particular assignment will be in connection with the collecting and compiling of national forest statistics.

Howard R. Sayre succeeds Horace J. Andrews as chief fire warden of Michigan, after assisting him for three years. Mr. Sayre is a graduate of the Michigan State College and has been connected with the Michigan Department of Conservation since 1923.

Victor H. Sonderegger has been appointed State forester of Louisiana. Mr. Sonderegger, who is a graduate of the Biltmore Forest School, has previously held that office, and has engaged for a number of years in private forestry work in the South.

D. F. McGowan, principal attorney of the United States Forest Service, has been transferred to the Department of Justice as special assistant to the Attorney General. Mr. McGowan has been selected to present to the proper courts the Government's case relating to the Northern Pacific Railway land grants. He will be assisted by E. E. Danley, who made a study of the Northern Pacific land grants case for the Department of Justice when the case was being investigated by Congress. This transfer, which is the outgrowth of Mr. McGowan's successful handling of this case for the Department of Agriculture, comes at the end of his twenty-first year in the Forest Service.

Thomas D. Burleigh has resigned as head of the division of forestry, Georgia State College of Agriculture, to accept a position as associate biologist with the Bureau of Biological Survey. He has been assigned to the Appalachian Forest Experiment Station, Asheville, N. C., where he will carry on research work in forest biology authorized by the McSweeney-McNary Act. Mr. Burleigh is a forestry graduate of the Pennsylvania State College, and received the M. S. degree in forest zoology from the University of Washington. His teaching experience in the Georgia college has covered a period of nine years. DuPre Barrett, who has been connected with the Georgia State College for about five years as extension forester, has been appointed acting head of the division of forestry. Mr. Barrett is a graduate of the Georgia State College and taught in it for some years prior to his appointment as extension forester. K. S. Trowbridge, a forestry graduate of the University of Washington who has recently been teaching forestry at the Georgia State College, succeeds Mr. Barrett as extension forester.

Oliver L. Austin, jr., has been appointed assistant biologist, Bureau of Biological Survey, and assigned to the Lake States Forest Experiment Station. Mr. Austin received the B. S. degree from Wesleyan University and has done three years' graduate work at Harvard University.

Walter E. Bond has resigned as assistant to the State forester of Texas to join the United States Forest Service as forest economist. He has been assigned to the staff of the Southern Forest Experiment Station and will assist E. A. Ziegler in a study of the financial aspects of private forestry practice.

P. L. Buttrick, who recently retired as forester of the Connecticut Forest and Park Association, will sail early in March for Europe, where he expects to spend the next two years. He will make a comprehensive study of the cork oak forests of Spain, France, Portugal, and North Africa. Mr. Buttrick continues in office as secretary of the Connecticut association.

Hugh M. Curran, formerly of the North Carolina Department of Agriculture, is now teaching forest management in the University of the Philippines. Mr. Curran was previously connected with the Philippine Bureau of Forestry, and has had experience in tropical exploration work in South America and in the West Indies.

Floyd V. Horton, supervisor of the Columbia National Forest, Wash., has been transferred to the United States Forest Service headquarters in Portland, Oreg., where he succeeds the late Douglas C. Ingram as inspector in the office of range management. Mr. Horton, who received forestry and range management training at the Iowa State College, entered the United States Forest Service in 1913 and has served on five national forests. The new supervisor of the Columbia Forest is John R. Bruckart, formerly assistant supervisor of the Olympic National Forest, Wash.

R. N. Cunningham, who has heretofore repre the United States Forest Service in work carri under the Clarke-McNary law in cooperation wi States of Montana and Idaho, has been transfer the Lake States Forest Experiment Station for w connection with the nation-wide forest survey.

Oscar T. Quimby, who has been conducting e ments on the electroendosmosis of wood at the Products Laboratory, Madison, Wis., recently re to accept a position in the research division Proctor & Gamble Co., Cincinnati, Ohio.

James L. Averell has been transferred from the States Forest Experiment Station to the Sou Forest Experiment Station, where he will parti in research in naval stores production. He tak place of N. T. Mirov, who recently resigned to turpentine and paint organization on the Pacific

E. I. Terry, formerly forest manager of the Schools, Mount Berry, Ga., is now assistant forester of South Carolina.

J. Oscar Blew, jr., has been appointed an inst in the department of timber preservation, New State College of Forestry. He succeeds Geor Kramer, who recently resigned to enter the emp K. M. Mitchell, industrial engineer.

LeRoy C. Stegman has been appointed instruc the department of zoology, New York State Coll Forestry. Mr. Stegman received the B. S. degree the Michigan State College in 1928 and the degree from the University of Michigan in 1929 was an assistant instructor in zoology in both in tions.

T. H. Harris, a member of the 1927 forestry cl the University of California, is a research assist the University of Idaho this year, specializing in pathology. This assistantship was established o basis of a gift from the Potlatch Lumber Co.

Officers elected by the Texas Forestry Associat November for the ensuing year are: President, Stone, Jasper; president emeritus, W. Goodrich Waco; vice presidents, L. D. Gilbert, Texarkana, Filson, Houston, and Mrs. Ben Boydstun, secretary-treasurer, E. O. Siecke, College Statio

J. R. Rapp has been transferred from the New field office of the National Lumber Manufact Association to take charge of the association's burgh office, 802 Law and Finance Building. succeeds Harold S. Crosby, who has been trans to Kansas City. Mr. Rapp is an alumnus of the sylvania State College of Forestry.

William H. Badeaux has resigned as secretary Northwestern Lumbermen's Association, Minnea after eight years' service in that office. He is affiliated with the Chicago Mill and Lumber C ration of Chicago as divisional sales manager in c of insulation sales, with offices in Minneapolis.

is M. Baker has resigned as associate State er of New Jersey to join the staff of the Pennsyl- State Forest School. He will direct the Pennsyl- Forest Research Institute at Mont Alto, lin County. Mr. Baker is a forestry graduate of nnsylvania State College. He had several years' ence on the national forests in Arizona before to New Jersey in 1917 as assistant State forester. g his service as associate State forester, dating 1922, he has devoted much time to forest research.

iam E. Branch has been appointed superintendent tt National Park, Okla. Mr. Branch entered the National Park Service in 1922 as a ranger on the Mesa Verde National Park, Colo., and has since served with the Indian Service in Oklahoma.

D. Priscilla Edgerton, for three years State supervisor of forestry education in Mississippi, has resigned to accept a position on the editorial staff of the United States Forest Service. Mrs. Edgerton was previously connected with the Forest Service for an extended period and was for several years an assistant editor in the Office of Information, United States Department of Agriculture.

Bibliography

The Prairies of Madagascar

By E. N. Munns, United States Forest Service

nditions interestingly similar to those found in of the United States are described in a study [1] by r de la Bathie of the prairies of Madagascar. es make up 70 per cent of the area of this island. athie found that the Madagascar prairies are not table condition but exemplify retrogressive series anges. The various stages in the retrogression ently depend upon ecological factors and the con- ion of the soil. The final stage is the Aristida e, the characters of which are the same in all parts island.

ept in the southwest portion, the soils of the island nostly lateritic clays. Under a forest cover the remain soft and permeable. When deprived of rotective vegetation the rich humus layer, which y thin, soon disappears under the action of fire, nd erosion, and the outcropping clays then become and impermeable. In this condition the laterite rs to be just about as fertile as bare rock. It is sting to note that the character of the vegetation a direct relation to the thickness of the humus ng; when the latter is intact the soil is capable of rting a forest from 65 to 95 feet in height; but it has disappeared, the hardened soil supports thin covering of xerophytic grasses.

the southwestern areas, because of the extreme ss, the successions of vegetation do not occur. e eastern zone every stage in the series of succes- s found. This zone in primitive times was cov- by two forest belts, the littoral and the eastern . The littoral forest has met with destructive nent through abusive exploitation and through ng. The sandy substratum of this forest belt denuded and exposed to the sun and to tropical soon becomes sterile, and the forest is immediately replaced by a meager vegetation, the final stage of the retrogression, without any intermediate phase. The eastern forest, largely destroyed by the natives for the sake of growing rice, now covers no more than about 3,000,000 hectares. Elsewhere it has been replaced, after burning, by scrub growth from 9 to 12 feet in height, and finally by prairie.

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ier de la Bathie: Les Prairies de Madagascar. Revue de Bota- ppliquée et d'Agriculture Coloniale, No. 84-86, pp. 549-557, 696- aris, Aug.-Oct., 1928.

American Forestry Literature Poorly Represented in European Libraries

In visiting a number of forestry libraries in Europe during the past summer and fall E. N. Munns, of the United States Forest Service, found them very scantily supplied with American forestry literature. The libraries visited were found to be receiving very few, if any, of the bulletins and reports of the American forest schools and State forestry organizations except the more formal book publications. Mr. Munns believes that many of these foreign institutions and organizations would be glad to make arrangements with American institutions and organizations for an exchange of publications.

A list of important foreign forestry libraries can be obtained from the United States Forest Service, Washington, D. C.

A Circular for Extension Foresters

A mimeographed circular entitled "The Extension Forester" is now being issued by the United States Department of Agriculture. The first number, issued in October, presented material selected from the 1928 annual reports of the extension foresters of 26 States. Special attention was given to definite achievements in developing programs and in increasing the scope of activity, and to new and improved methods that appeared to merit general application. William K. Williams, extension forester of the Office of Cooperative Extension Work, plans to get out this circular at 3-month intervals.

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How Birds and Forests Affect Each Other

In a bulletin entitled "The Summer Birds of the Northern Adirondack Mountains,"[1] Aretas A. Saunders, field ornithologist of the Roosevelt Wild Life Forest Experiment Station, has included a general discussion of the interrelations of birds and forests. On the basis of evidence accumulated by a number of students of bird life Mr. Saunders affirms very emphatically that birds consume enormous quantities of insects at the season when this results in the most economic good to man. The body temperature of all species of birds, he says, is above 100° F. and that of the smaller insectivorous birds of the forest is often as high as 108° F. The rapid heart action and rapid breathing, circulation, and digestion of food that accompany these high temperatures mean food requirements proportionally much larger than those of man and most other mammals. This is true not only of adult birds but of the young, which grow very rapidly. All the smaller song birds of which the food habits during the nesting period are known feed their young on insects. Even seed eaters use insects largely, if not entirely, when feeding their young in the nest. Nestlings of certain species are known to have gained six or seven times their weight within two weeks after hatching. In the months of May and June, which in general constitute the nesting season of birds, the annual life cycle of most insects is at its beginning. Therefore, when the nestling gorges on insects the production of many insect descendants is forestalled.

This author questions the theory that fungi and insect parasites are more effective than birds in keeping harmful insects in check. "Each individual parasite is brought into the world at the expense of not more than one individual of the insect host, whereas each individual insectivorous bird eats large numbers, often hundreds, of insects every day of its life. * * * The number of species of parasites known definitely to attack but a single host is small. * * * Hairy caterpillars, which are not eaten by most species of birds, seem to have the largest number of species of parasites. Yet they are frequently the most abundant and most destructive species, particularly to foliage of trees. * * * Insects are most abundant and occur most commonly in uncontrollable numbers, not in natural forests but on city shade trees and in agricultural areas where natural conditions have been destroyed so that birds can not live there in normal numbers. Destruction of natural cover decreases bird life but has no appreciable effect on the abundance of parasites, yet in such cases parasites seem unable to hol
insect hosts in check."

Birds that eat tree seed, Mr. Saunders belie
general pay their way by scattering and distri
seed. Birds of prey perform a valuable service i
ing small rodents in check. The sapsucker, he
clined to think, largely confines its attacks to t
valuable tree species and does less injury tha
generally been supposed.

Turning to the influence of forests on bird
Saunders condemns strongly the tendency to
forests and roadsides of underbrush in the belie
"bushes are somehow untidy," thus making the
inhabitable for birds; also the indiscriminate re
from the forests of dead trees and stubs, desi
homes by the woodpeckers, on the theory tha
harbor fungi and insects of harmful possibilities.
not know of a single species of insect or fungu
asserts, "that starts in a dead tree and spreads
there to live ones." Efforts to increase the num
birds on a given area are best expended in res
natural conditions rather than by artificial fe
and the possibility of attracting to an area by ar
feeding larger numbers of birds than are attrac
it by natural forest conditions is limited by th
that each nesting pair of birds instinctively refu
permit others to nest within a certain distance.

An East African Estimate of F Influences on Climate and W Supply

By E. N. Munns, United States Forest Service

During the past quarter century there seems to
been a marked let-down in the interest felt by Am
foresters in forest influences as contrasted with
products. In the early days of forestry in the U
States the former aspect of the subject had as
a hold on the interest of the profession as the l
in fact, forestry in America was founded princ
on the belief that forests play a vital part in the
lation of stream flow, in the amelioration of cli
and in the prevention of erosion. Nowadays
considerations seem to be greatly overshadowe
the interest of the average American forester, b
potentialities of the forest as a source of lumb
our houses, pulp for our newspapers, and cellulo
our stockings. It is therefore doubly interesti
come upon such a lively argument in support o
earlier faith as that which J. W. Nicholson, f
adviser to the Governments of Kenya and Ug
East Africa, presents in a bulletin recently publ
by the forest department of the former colony.

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[1] Roosevelt Wild Life Bulletin, vol. 5, no. 3. 496 pp. illus. Syracuse, N. Y., 1929.

Nicholson states that the physicogeographic ›s of Kenya, Uganda, and neighboring countries ch as to render it extremely improbable that vapor can adequately penetrate into all parts Provinces, and that from the point of view of the its of Kenya the most important influences of are those which concern rainfall and water . At least in parts of the two Provinces, he ›s, changes in the vegetative covering are apt ve not only an appreciable but an enormous on the total rainfall, trees and deep-rooted contributing more moisture to the air than eous vegetation or bare soil. On the basis of can studies and of research carried out by ›s at the South African Forest Experiment n he concludes that under favorable circumstances ain forests can induce "occult precipitation" ure condensed from fog or dew) amounting to ch as 25 per cent of the total annual rainfall. lieves that in the case of such rainfall as accom- monsoons the local effect of forests is limited aximum of about 3 per cent of the precipitation igh the regional effect may be far greater. meteorological conditions in East Africa are ble to the production of "instability rain" accompanying the convectional type of storm), onvinced, the presence of forests greatly increases uantity of such rain. He quotes a series of nal observations in India and Uganda in support is theory regarding instability rain, which in Africa occurs frequently on still afternoons, y after bright sunny mornings, and is always wly local in its distribution.

onsidering the relationship of forests and stream- he author expresses the belief that in hilly coun- forests are ordinarily conservers of stream flow, that the steeper the slope and the heavier the pitation the greater is this influence. By pre- ng erosion and checking surface run-off, forests ase the underground seepage and so tend to main- a steady flow of water in streams. Other theories d include the following: The moisture capacity of porous soils not liable to erosion is less subject to ovement by forest cover than that of shallow non- eable soils and soils liable to erosion. The er the porosity of the underlying rock the less is a forest cover to exercise a beneficial effect on m flow. Where rainfall is normally continuous ight there is less need for the soil to possess a large ture capacity than where rainfall is heavy and ular. In the latter case forests have a greater ence on run-off; they can mitigate the severity of s induced by heavy rain, although they appar- can not prevent such floods. In general, on wet the local flora tends to reduce the amount of ture it contains, whereas on dry soils it tends to increase such moisture. It is otherwise with fast-growing exotics such as gums or wattles in South Africa, which have been shown by research to exert a great desiccating influence on the soil.

Proceeding to the subject of forests and wind, Mr. Nicholson strongly advocates the development of windbreaks to protect agricultural areas in Kenya from desiccating northeast winds.

Farmers in Kenya, the author reveals, are not unaware of the importance of the influence of forests on water supply and climate; in recent years various farmers' associations have passed resolutions urging the local government to adopt a bold policy of forest conservation and afforestation.

(Nicholson, J. W.: The Influence of Forests on Climate and Water Supply in Kenya. pp. 10. Colony and Protectorate of Kenya Forest Department Pamphlet No. 2. The East African Standard, Ltd., Nairobi, 1929.)

Timber Growing and Cutting Practice in the Lodgepole Pine Region

In the bulletin entitled "Timber Growing and Cutting Practice in the Lodgepole Pine Region," the United States Forest Service has published a discussion of silvicultural and timber-marketing problems that are primarily its own. The timberland of the lodgepole pine region comprises about 23,000,000 acres of mountain and higher foothill land in Montana, Wyoming, Colorado, Utah, Nevada, and southeastern Idaho; of this acreage, exclusive of that included in the Yellowstone, Glacier, and Rocky Mountain National Parks, about 87 per cent is in national forests. Approximately 5 per cent is in the public domain or within Indian reservations, 1 per cent in State ownership, and 7 per cent privately owned.

In general the timber of this mountainous region grows slowly, largely because of high altitude and also, on many areas, because of rocky site, shallow soil, or a crowded condition of the stand; the timber is relatively low in quality, and in many localities the rugged topography makes logging operations expensive. Nevertheless the forests of the lodgepole pine region serve a very important purpose immediately affecting the lives of people in the States named and in neighboring States; they regulate and conserve water supplies that even if perfectly conserved would be insufficient to irrigate all the arid lands which in order to become productive would have to be irrigated from this source.

Railroad ties are the principal forest product marketed in the lodgepole pine region. Others are mine props and mine timbers, telephone poles, and lumber. For silvicultural reasons an additional market for small-sized material such as might be utilized for fence posts or paper pulp is greatly needed.

The most important forest type of the region, from the standpoint of volume and of present demand, is that in which the predominant species is lodgepole pine. Large continuous stands of lodgepole are an outstanding characteristic of its timberlands. This species typically occurs in dense, even-aged stands, many of which are seriously crowded and stagnant. By far the most important type in the region for watershed protection is that containing 50 per cent or more of Engelmann spruce. In the third outstanding type the characteristic species is Douglas fir.

Lodgepole pine begins to bear seed at an age of about 15 years and produces at least a fair crop of seed each year. Some of the cones remain unopened on the trees for years, and thick cone scales protect the seed from fire injury. For these reasons lodgepole pine forests reproduce plentifully even after clear cutting or burning, unless a second burn occurs before the trees reach cone-bearing size. Engelmann spruce and Douglas fir are later in beginning to bear seed, and produce good crops of seed less regularly. However, since these species typically occur in uneven-aged stands, advance growth is usually present at the time of cutting; and trees less than 10 inches in diameter are usually left as unmarketable. In general the Engelmann spruce and Douglas fir types restock amply after cutting if the cutting is not followed by fires, and, in the case of the latter type, if the cover and slope give protection from direct sunlight. Thus the requirements for keeping forest lands in the region productive largely narrow down to a matter of fire protection and slash disposal.

Features of the cutting practice suggested for the region by M. W. Thompson, author of this bulletin, are that trees should be cut as nearly as possible at the time when mean annual growth begins to decline; that light cuts should be made, at relatively short intervals; that danger of damage from windthrow should be carefully considered; and that young growth should be protected from logging damage.

In the lodgepole pine type, where stands are dense at all ages and high winds recur frequently, fires are usually intense. The thin bark of the lodgepole, also, affords little protection. In the Douglas fir type the situation is much the same, except that the Douglas fir is protected by a thicker bark. In the Engelmann spruce type fires are more rare but protection is even more important, because an extensive severe burn usually precludes restocking. In general, the risk in this type is less, because sites are more moist and elevations higher. An important element in the fire situation is the fact that neither power logging nor logging railroads are used. Locomotive-caused fires have been largely eliminated. At present campers and smokers and lightning are responsible for nearly all fires. Mr. Thompson describes the fire-protecti tem maintained in the region by the Forest S and protection measures recommended by the to railroads, lumber operators, and forest visito

In the lodgepole pine and Douglas fir typ Forest Service has found it desirable where fire is serious to lop the limbs from the tops of felle and leave the slash on the ground, except in pl special fire hazard such as around sawmills and and along main roads, where it is best to pile an the slash. This plan means piling and burnin on about 5 to 10 per cent of the cutting are localities of high risk, slash is piled and bur strips 100 feet wide so as to leave no continuo of slash exceeding160 acres. In the lodgepole pi broadcast burning of slash results in too dense duction, and burning the slash in piles results in d to standing trees. The slash left on the ground tegrates fairly rapidly, helps to build up the pro ity of the soil, and in many places aids materi preventing erosion. This practice has been fo on national forest areas in the region since 192 no increase in the acreage burned annually. Engelmann spruce type, because the spruce has and larger limbs and utilization is generally less plete, more slash is usually left after logging. ever, whereas the needles of lodgepole pine ma sist for two years or longer those of the spruc off during the first year after cutting. Accor throughout the greater portion of the region the tice on the national forests is to lop spruce slas leave it on the ground.

Copies of this bulletin may be obtained, whi supply lasts, from the Office of Information, U States Department of Agriculture, Washington,

Leaflet Describes Yellow Poplar an Propagation

Characteristics of yellow poplar that make it high, perhaps first, among hardwoods in its rang species desirable for propagation, are described popular leaflet prepared by E. F. McCarthy, di of the Central States Forest Experiment Statio table gives average growth and yield per acre in stocked stands. Conditions required by the tr successful natural reproduction are described, and tions are given for growing and transplantin seedlings. The 7-page multigraphed leaflet, en "Yellow Poplar," is supplied on request by the U States Forest Service, Washington, D. C., and b Central States Forest Experiment Station, Colu Ohio.

d Utilization Committee Reports on sts with Scandinavian Gang Saws

ults obtained in tests made with Scandinavian aws in a Pacific coast lumber mill have recently ublished by the National Committee on Wood tion, United States Department of Commerce. angement of the committee, in order that these night be made Scandinavian manufacturers in- gang saws at the mills of the Tumwater Lum- ills Co. (Inc.), at Olympia, Wash. The installa- as completed in April, 1929.

committee reports that the tests have proved the ility of profitably manufacturing lumber from logs 8 to 20 inches in diameter, and logs of low such as under current logging practices are left e loggers in large quantities in the woods of the west. The explanation is the economy in opera- ffered by this type of gang saw, which requires bor than the types of saw usually employed in ountry and requires no skilled labor; the very saving in raw material; and the smoothness and acy of the cut. Under certain conditions, it is ted, the gang-saw system will enable the American cer to increase by 15 or 20 per cent the portion of ee which he converts into lumber.

gether with its 17 pages of text the report includes otographs and drawings showing the design and od of operation of the gang saws, the layout of the and details of the mechanical equipment used in nction with the saws.

pies of this report may be obtained from the Gov- ent Printing Office, Washington, D. C., for 10 cents e.

The Forester as Versifier

the 10 years since he published The Forest Ranger Other Verse, John D. Guthrie, of the Portland, ., district office of the United States Forest Service, continued to keep an eye out for material of the which he collected and edited for that volume. ntly he has published a 321-page volume prepared similar plan and entitled "Forest Fire and Other e." The verses in this book have been chosen by Guthrie as reflecting in one way or another the life, , and point of view of the American forest ranger ther forest worker. Many of them were written by ers.

ading themes are the charm of forests and moun- , the joy of life in the open, and the rigorous conditions in which the ranger lives and works. The large element of humorous verse brings in the ranger's pet aversions such as routine reports, pack rats, and thoughtless forest visitors. As the title implies, forest fire predominates over other subjects. Versified warnings to the smoker and the camp-fire builder appear in abundance, many of which are well framed to win attention and stir the conscience. Fifteen pages are occupied by a group of "songs for foresters."

In following out his stated purpose Mr. Guthrie has voluntarily presented much that is faulty. Metrically, for example, the average grade of the collection is disappointing.

In a foreword to the volume Will C. Barnes testifies to its interest and to its historic value.

Trees of Illinois

By Doris W. Hayes, United States Forest Service

A manual of 339 pages entitled "The Native and Naturalized Trees of Illinois"[1] has recently been published by the Illinois Natural History Survey as the fifth of a series of forestry bulletins publication of which began in 1910. The authors are Robert Barclay Miller, now chief forester of the State department of conservation, and L. R. Tehon, botanist of the natural history survey.

This bulletin is designed for use not only by teachers and students of botany and amateur botanists but by others interested in trees or in forest conservation; consequently the use of technical terms has been avoided as much as possible. More than 135 different kinds of trees are discussed, most of them in considerable detail. Accompanying the descriptions of species are 98 full-page photographic plates illustrating character of buds, leaves, twigs, and fruit, many smaller ones showing individual trees or timber stands, and outline maps of the State showing the distribution of the different species. The uniform procedure has been to give the scientific name and author, one or more common names, and a rather detailed botanical description. The nomenclature agrees with that used in the second edition of Sargent's Manual of the Trees of North America. Notes dealing with distribution of the species, its relations to environmental factors such as soil and topographical features, growth habits, and commercial value and uses, complete the discussion.

"Keys to the trees for the four seasons" have been contributed by William Trelease, emeritus professor of

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[1] Vol. xviii, art. 1, Illinois Department of Registration and Education, Division of the Natural History Survey, Urbana, Ill., 1929.

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botany, University of Illinois. These furnish a very practical means of readily establishing tree genera and of coordinating the characteristics of the four seasonal aspects of any given genus.

A section on the botany of trees includes careful directions for collecting and preparing specimens. These are well aimed to stimulate active interest and cooperation in collecting specimens and in accumulating and correlating data on distribution of species. This section includes about 30 photographs, mostly showing microscopic structure of various hard and soft woods.

The bulletin closes with a short history of the work of forest conservation in Illinois.

Bibliography of North American Forestry Literature in Preparation

The National Research Council and the United States Forest Service are cooperating in the preparation of a bibliography of North American forestry literature. It is proposed to prepare this bibliography on a plan much the same as that of the Catalogue of Publications Relating to Forestry in the Library of the United States Department of Agriculture, issued by that library in 1912. The catalogue of the Forest Service library will be used as the starting point for the new bibliography, but the work will include additional references indexed by other institutions. It is intended to include titles for all forestry material published in Canada, the United States, Mexico, the West Indies, and Hawaii prior to January 1, 1930.

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Map Folder, National Forests of California.

Forest Service Directory.

National Forest Administrative Maps: ½-inch, Huron, Medicine Bow, Uncompahgre; ¼-inch, Gila, Huron, Medicine Bow, Pisgah, Uncompahgre, Wasatch, White Mountain; ⅜-inch, Nantahala; 1/12-inch, Tongass; 1 : 50,000, Luquillo.

National Forest Proclamation Diagrams: ¼-inch, Pisgah, White Mountain; ⅜-inch, Nantahala.

Atlas Folio, 3-color, Caribou National Forest.

U. S. GOVERNMENT PRINTING OFFICE: 1930

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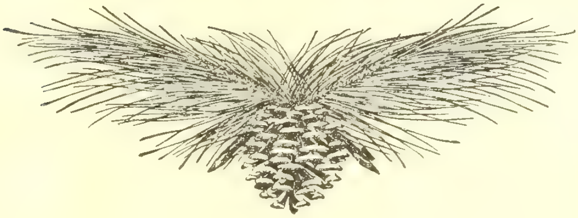

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Announcements

Second International Congress of Soil Science

The Second International Congress of Soil Science will be held in Russia July 20–31, 1930, under the presidency of C. C. Gedroiz. The first six days the meetings will be in Leningrad and the remaining time will be spent in Moscow. In each city a series of excursions will be arranged. Exhibits will include special displays devoted to forest soil science. After the congress an excursion of 29 days will be made across the soil zones of European Russia, during which the members will have the opportunity to visit higher schools, agricultural experiment stations, and agricultural and industrial enterprises.

Inter-American Conference on Agriculture, Forestry, and Animal Industry

September 8–20 is the time decided on for the Inter-American Conference on Agriculture, Forestry, and Animal Industry to be held this year in Washington, D. C. Each nation in North, Central, and South America is being asked to send an official delegate and other delegates who are specialists in agricultural production and marketing. Leon M. Estabrook, who for the past five years has been in charge of the World Census of Agriculture, with headquarter Rome, is assisting A. F. Woods, director of scien work, United States Department of Agriculture making arrangements with the Department of S and the Pan American Union for the conference.

Georgia Commercial Forestry Confere

A Georgia Commercial Forestry Conference wil held at Savannah May 26–28. It will be arranged a committee of Georgia citizens appointed at a mee of representatives of the Georgia Forestry Associa and the United States Chamber of Commerce. V ous phases of the problem of developing the full c mercial possibilities of forest land in Georgia are t considered, including fire protection, reforestat improvement of turpentining and logging meth and more complete utilization. In conjunction the conference the Georgia Forestry Association hold its annual meeting.

National Conference on State Pa Meets in June

The National Conference on State Parks will hol tenth annual meeting at Linville, N. C., June 17 1930.

The Forest Worker is published by the Forest Service, United States Department of Agricultur Washington, D. C. Jean Kerr, editor. Material offered for publication in the Forest Worker shoul be addressed to the editor.

Because the free edition is necessarily limited, this periodical can be distributed without char outside of the Government service only to such persons and organizations as State forestry and conserv tion officials, State agricultural extension directors, faculties and libraries of forest schools, and forest associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Prin ing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

FOREST WORKER

ashington, D. C. MARCH, 1930 Vol. 6, No. 2

State Forestry

Massachusetts State Forests Provide Work for Unemployed

place of State forests in the economic structure
tate was recently illustrated in Massachusetts
Governor Allen allotted to the department
nservation a special appropriation of $25,000
used in relieving unemployment. The Governor
termined that the department could in this way
e employment to men in widely scattered sections
State and, since the regular employees of the
ment could provide the necessary supervision,
o overhead expense. As a result the department
n more than 300 additional men from 42 towns
ut them to work on 25 State forests for five weeks
February and March. The overseers of the
n the various towns and cities enabled the depart-
to get into touch with the men and in many
ces the towns furnished trucks to transport the
o the forests. The men were hired mostly from
y towns. Most of them had had no employment
eks or even months. They were paid from $3.50
a day. Rather simple work was assigned to the
as many of them were unaccustomed to woods
but a surprising percentage of them showed
ncy with ax and brush hook, the conservation
tment reports. Forest roads were brushed out,
woodlands thinned, release cuttings made in
ations, brush land cleared for planting, and slash
t-over lands cleared and burned.

ne Reduces Fire Protection Tax for 1930

creases in forest fire protection costs in Maine
g the last few years have resulted in the building
f a surplus of $175,000 in the State's forest fire
ction fund. As a result the Governor and
cil, acting on the suggestion of Forest Com-
oner Violette, have reduced the rate on the
ted district by three-fourths of a mill for 1930,
ng it 1½ mills. Instead of raising $165,000 by
tion during the year for protection against fire
State will raise only about $110,000.

Virginia Commercial Forestry Conference

The Virginia Commercial Forestry Conference held in Richmond February 11 and 12, under the sponsorship of the Virginia Chamber of Commerce and with the assistance of the United States Chamber of Commerce, had a registered attendance of 167. Unregistered attendance included 17 members of the State legislature who were present at the banquet on February 11.

John R. Hutcheson, director of the extension service of the Virginia Agricultural College, and Wilson Gee, professor of rural economics and rural sociology in the University of Virginia, opened the program with discussions of the effect of agricultural depression on land use in Virginia. State Forester Chapin Jones gave a talk on Virginia's forest situation. Thomas L. Farrar, a member of the State commission of conservation and development, brought forward the commission's State forest program, under which it is proposed to create State demonstration forests on a scale of about 10,000 acres to each county. Thomas W. Ozlin, former speaker of the Virginia House of Delegates, expressed himself as strongly in favor of this plan, and Max Fleischer, State president of the Izaak Walton League, spoke in support of it as a representative of that organization. W. L. Gooch, forester of the Hummel-Ross Fibre Corporation, and P. Ryland Camp, vice president and general manager of the Camp Manufacturing Co., represented private forestry. Wilbur O'Byrne, State extension forester, spoke on the possibilities of profit from farm forestry. James O. Hazard, assistant State forester, described the State's present tree-planting and nursery practice and estimated what could be done within 20 years to reforest Virginia's unproductive acres.

As a banquet speaker R. Y. Stuart, chief of the United States Forest Service, brought out the point that, although land utilization and other surveys should be made, it is not necessary to wait for the completion of such studies before tackling the obviously necessary and desirable tasks such as acquisition of State forests and protection of forests from fire.

Axel Oxholm, director of the National Committee on Wood Utilization, United States Department of

Commerce, summarized the results of the wood-waste survey made in Virginia by that committee with State cooperation, which indicated an annual waste in the State of 28,000 carloads of wood. J. Elton Lodewick, of the Virginia Polytechnic Institute, discussed the recent development in Virginia of industries using forest products, stating that the lumber consumption of the furniture industry in Virginia increased by 500 per cent in the period 1911–1928, inclusive. Fred R. Fairchild, director of the Forest Taxation Inquiry of the United States Forest Service, outlined problems of forest taxation.

Resolutions adopted by the conference urge that a soil survey of Virginia be completed as soon as possible; that State and Federal forestry activities be encouraged and supported by more adequate appropriations; that fire protection be extended to cover the entire forest area of Virginia; that provision be made for a thorough study of the effects of the present system of forest taxation in Virginia and in other States; that forest management on private lands be encouraged; that forest areas be acquired by the State through purchase or otherwise for purposes of demonstration, experiment, watershed protection, recreation, and protection of wild life; that reforestation be encouraged in the State; that facilities be provided for instructing and assisting farmers and others in the economical production and disposal of forest products; and that existing agencies assist in the utilization and disposal of forest products.

The conference led to the forming of a Virginia Forestry Association, the president of which is W. D. Tyler, of the Clinchfield Coal Corporation, Dante, Va. Vice presidents of the new association are ex-Gov. E. Lee Trinkle, Roanoke; P. Ryland Camp, Franklin; and Milton E. Marcuse, Richmond. The directors are J. C. Phillips, Tappahannock; T. J. Wright, Norfolk; Ellis Olsson, West Point; I. J. Ozlin, Kenbridge; A. N. Carroll, Rocky Mount; D. H. Barger, Shawsville; H. S. Hedger, Charlottesville; Max Fleischer, Gordonsville; A. J. Russell, Tazewell; and I. M. Gathright, Covington.

Vermont Village Has Had Community Forest for 30 Years

The village of Essex Junction, Vt., has had a community forest since 1900. In that year the village purchased 10 acres of land surrounding springs from which it derives water. Later purchases have gradually extended the area to 752 acres of watershed land, the total cost of which has been $8,800. In 1923, 1924, and 1925, 150,800 trees were planted on this land. Since 1923 the village has sold $12,179 worth of logs and cordwood from the forest. The water commissioners estimate that there are now on the forest approximately 600,000 feet of standing timber and 2,500 cords of wood that are marketable.

Massachusetts Town Forests

During 1929 the area in town forests in Massa setts was increased by 84.6 per cent. There are in the State 86 town forests aggregating 19,504 a The appropriations for these forests total $119,000 the number of trees planted on them up to the e 1929 was 2,663,000. Under its offer to plant trees free of charge as a planting demonstration fo city or town that will set aside 100 or more acres town forest the Massachusetts Forestry Associ has planted 190,000 trees on 38 city and town fo

About 50,000 acres of land in addition to that c fied as town forests is owned by cities and towns o State in their watersheds.

Fire Records Broken in New Yor

The 1929 report for the New York fire districts s less burned-over acreage than that of any previous although the number of fires exceeded the averag all previous years of record by 95 per cent. Accor to figures compiled by the State conservation de ment the year's fires numbered 826, but covered 25,122 of the nearly 9,500,000 acres of land incl in the districts. The average area burned over fire, 31 acres, was only one-third of the average reco for preceding years. The 1929 fires burned about fifth of 1 per cent of the entire protected area, div about equally between areas bearing tree growth open land. Blame for causing 42 per cent of the was laid to careless users of smoking materials an per cent of the fires were charged to campers, hun and fishermen. The burning of brush and rubbish found to account for 17 per cent and railroads held responsible for 12 per cent.

In the fire towns of the Adirondack and Cat sections, which include most of the State-owned f land, 349 fires occurred during the year Novemb 1928–November 1, 1929, burning over 1,584 a The area burned represented about one-fiftieth per cent of the total area under protection and a one one-hundred-and-twenty-fifth of 1 per cent o tree-covered area. Except in 1928, such a small bu area was never before recorded for the fire to The average area per fire was about 4½ acres, the s est of record. Fires were classified by cause as foll 31 per cent, smokers; 30 per cent, fisherman, hun and campers; 10 per cent, brush and rubbish bur and 10 per cent, railroads.

❦

Title to 11,000 acres of land along the headw of the Savage River, Garrett County, Md., has rec passed to the State. This and an adjoining are 5,000 acres purchased two years ago now com Maryland's largest State forest.

1929 Fire Record for California

e forest, brush, and grass fires occurred in Cali- during the notably long, dry season of 1929 than previous year since organized fire protection has n force in the State, according to a combined of the United States Forest Service and the nia Department of Natural Resources covering n State, Federal, and privately owned land. A f 4,803 fires that burned over 1,153,462 acres and damage amounting to $2,773,245 was the past fire record. These damages combined with the spent by State, Federal, county, and private y agencies in preventing and suppressing fire up a fire bill of more than $5,500,000. (This does not include the $1,250,000 property loss by the Mill Valley fire, which started within mits on the brush slopes of Mount Tamalpais.)

ared with the record of 1928, that of 1929 shows rease of 632 fires; the area burned, however, was r by 400,000 acres than in the previous year, and tal damage was $100,000 less.

n-caused fires showed a marked increase, num- 4,424, or 92 per cent of the total number of fires, 9 as compared with 3,567, or 85 per cent of the in 1928. A large measure of the increase in man- l fires is attributed to incendiaries, who set a total conflagrations that burned 589,172 acres and l damage amounting to more than $1,000,000.

eless smokers ranked next, setting 1,631 fires that d 282,329 acres and did $518,225 damage. Care- ss in burning brush and débris caused 786 fires esulted in damage estimated at $204,463. Camp- aused 253 fires; railroads and lumbering caused nd 118, respectively. Damage from railroad fires stimated at $342,941, resulting largely from a disastrous fire that occurred on the Modoc nal Forest during a period of high winds.

rough cooperation of the United States Weather au, the United States Forest Service, and the ornia Division of Forestry, forest fire fighting in ornia is now facilitated by fire weather forecasts at the scene of the fire. A special truck has been ped with meteorological instruments for making forecasts, and has direct connections by radio the main forecasting office of the Weather Bureau n Francisco. Last summer the State put into ce four fire trucks equipped with tools, hose, water , and supplies for fire fighters, for general utility on forest, brush, and grain fires. Four additional rucks are in process of construction for the 1930 n. The Forest Service operates in California 11 atrol trucks equipped with fire-fighting tools, r water pumps, hose, and supplies, and 5 large trucks for use along roads and in towns, villages, mmer camps. In 1929 the Forest Service con- ted 286 miles of firebreaks and about 500 miles of rways and roads primarily for the purpose of fire ention and control.

Georgia's Fire Score Low in 1929

In 1929 fires covered only 10,588 of the 1,212,071 acres of land in Georgia for which organized protection was provided, according to records compiled by State Forester B. M. Lufburrow. In contrast with a burned proportion of less than 1 per cent on protected lands, on unprotected lands the proportion burned over during the year was 22 per cent.

Forest fires occurring in the State during the year were listed by the Georgia Forest Service according to cause as follows: Burning for grazing, 5,314; incendiary, 2,324; railroads, 1,662; smokers, 1,411. Other fires were charged to turpentining and lumbering operations, campers, brush burning, and lightning.

Forest fire protection in Georgia in 1929 represented the expenditure of $62,298 of State, Federal, and private funds.

Fires of 1929 Cover 2,000,000 Acres of Arkansas Timberland

Information derived chiefly from county agents' reports indicates that 7,866 forest fires burned over a total of 2,061,820 acres of Arkansas timberland in 1929, the extension service of that State reports. This total is 330,000 acres above the average for the period 1924–1929. Bradley County reported 200,000 acres burned and Drew County reported 150,000. The largest burn reported was in Randolph County, where a single fire burned over 50,000 acres.

New Forest Protection Unit Established in Texas

Gibbs Bros. & Co., the Foster Lumber Co., and the Delta Land & Timber Co. have agreed to cooperate with the Texas Forest Service in establishing a large forest fire protection unit in southern Walker and northern Montgomery Counties, Tex. The unit involves 111,293 acres of timberland owned by the three lumber companies and an almost equal area owned by smaller companies and farmers. In preparation for placing this area under protection at the beginning of the 1930 fire season a 97-foot steel tower has been erected on a high point about 13 miles south of Huntsville.

◆

Additions to Maine's fire protection system during 1929 included two new towers, 175 miles of telephone line, 6 storage houses for equipment, and a number of tool boxes. Two old towers were replaced.

◆

Governor Franklin Roosevelt of New York, who owns timberland surrounding Warm Springs, Ga., is leading a movement to establish a 100,000-acre timber-protective system in Meriwether, Talbot, and Harris Counties, Ga.

New Hampshire Supreme Court Hands Down Opinion on Constitutionality of Forest Taxation Bills

The Supreme Court of New Hampshire has given an adverse opinion on the constitutionality of certain provisions of the forest taxation program introduced in the legislature of 1929, but has suggested substitute measures for accomplishing similar ends. The tax-revision program was not acted upon at the 1929 session of the legislature, in which it was introduced by an interim commission, but at the Governor's request was held over in its entirety in order that an advance opinion as to the constitutionality of the various bills involved might be obtained from the supreme court. The opinion given by the court in reply to senate resolutions is in part as follows:

> House bill No. 5 provides for the exemption of standing wood and timber from taxation upon the owner's entering into a contract with the State to pay 10 per cent of the stumpage value at the time of severance. It is entirely clear that the act is not within the limits fixed by the constitution. It undertakes to make tax liability a matter of bargain and sale at the option of a certain class of property owners. Others have no such option. * * *
>
> It has been urged in argument that the plan is sustainable under the doctrine of Keene *v.* Roxbury, 81 N. H. 332. That case is not authority for granting an optional exemption to members of a class of taxpayers. It merely sustains the laying of a charge upon one municipality to be paid by another, when the latter discharges public obligations that are of benefit to the former.
>
> The claim that timber growing is a matter of general public interest, for the promotion of which a tax might be laid, is true only to a limited extent. * * * There is no power to lay a tax to be expended as a bounty to individual timber owners. * * *
>
> While the plan proposed by the bill is thus objectionable, we are of opinion that a similar result may be reached by the enactment of a general law removing standing timber from the class of taxable estate and imposing a tax thereon to be levied when the growth is severed from the realty. * * *
>
> Denial of the benefits of this form of taxation to owners of tracts of less than 5 or more than 500 acres is not permissible. Small amounts of property are sometimes exempted from taxation because of the presumed poverty of the owner or because the cost of assessment and collection would be unreasonably out of proportion to the tax. But these reasons have no application here. It has never been suggested that poverty was a reason for laying a tax upon those thus unfortunate; and as to expense, the proposed provision would call for laying and collecting many taxes instead of one.
>
> Nor can taxes be increased in ratio because the individual taxpayer owns more property than his neighbor. All taxes on like property and for like purposes must be equal.

The court affirms the constitutionality of a bill proposing to devote to the encouragement of forestry and the equalization of tax burdens the net revenue derived by the State from taxation of gas and electric utilities, from a tax upon personal incomes, and from severance fees to be received under an act exem standing wood and timber from taxation in cer cases. In so doing it makes the following statemen

> It is understood that the object in the State fo project is threefold. It stabilizes the flow of stre thereby improving water powers and water suppli provides natural attractions in the nature of p parks, and it promotes scientific timber growing individuals through the practical example of its c bility to yield profit.

Speaking of the distribution of tax funds to t containing timber exempt from taxation the court

> As we understand the situation, the legislature the added burden too great to be borne by the to If the State can not help, the project must fail. project, as before stated, being one of state-wide in est, it seems plainly to follow that the State can p erly aid in the way proposed. Although the lo local, the gain is thought to be state-wide.

Replying to queries contained in resolutions of House the court states the opinion that it is reaso to classify timber as taxable or nontaxable accordin its size; that in thus classifying timber discrimina between different species is warranted if based u known facts as to rapidity of growth, marketable etc.; that a tax upon the annual increment of tin appears to be in the nature of an income tax, laid cause property has come into the possession of owner within the year and laid but once, and being of this nature it must be coordinated with o income taxes and can not be laid at a rate and date different from those of other income taxes. opinion of the court on a bill to make volume per the test of taxability is as follows:

> If this were in fact a reasonable method of as taining the age or maturity of the growth, the prop test would be unobjectionable. In some case would be so. But there must be many instances wh scattered but mature growth would be exempt u this provision. The question, whether these woul so occasional and incidental that they might reason be disregarded in prescribing a general test, is on fact. But with such knowledge as we have of situation it is our opinion that they could not b treated and that the proposed test for taxability w therefore be invalid.

Rutland's City Forest

Rutland, Vt., has a city forest of about 3,500 a surrounding the small brooks and springs that are source of its water supply. The city entered up reforestation program in 1916 and has now pla 516,000 trees. Cutting operations are in progres a portion of the area that was purchased in 1 Between November, 1927, and April, 1929, gross ceipts for cordwood and logs cut were $8,890. city has erected informative signs along the main S highway, where planted northern white pines reached heights of from 25 to 30 feet.

Thirty-seven Vermont municipalities now have ests, totaling 8,725½ acres.

st Trees Planted at Fort Macon ate Park, N. C., in Effort to Fix nd Dunes

By F. H. Claridge, North Carolina Forestry Division

Fort Macon State Park, Beaufort, N. C., the
division of forestry is experimenting in the
on of sand dunes through forest plantings. About
cres of typical sand-dune land contained in the
was deeded by the Federal Government to the
in 1924. This area is part of Bogue Bank, which
ates Bogue Sound from the Atlantic Ocean. It
nts a problem typical of thousands of acres from
nia to Florida. The present growth on much of
and consists of grasses such as sea oats. A con-
able portion of the area is in the shifting sand
. The scattered thicket formations contain
on, live oak, and eastern red cedar. The problem
s to resolve itself into fixing the forward dune and
esting or reforesting the area protected by this
ard dune.

e first planting of trees behind the dunes at the
was made by the forestry division in February,
. These first plantations were greatly damaged by
which roamed up and down the banks; however,
maritime and loblolly pines planted in this first
t as 1-year seedlings have now reached a height of
ches. Plantings of several different species of
made in 1928 and 1929, after the sheep had been
ved, have survived in percentages ranging from
er cent to 15 per cent, according to species and
onditions.

is too early to make any definite predictions in
d to the success of these plantings; but indications
hat loblolly, maritime, and slash pines will do best
ese areas. It has been shown that young pines
established on the areas will grow well. Wind
sand action will probably be the limiting factors
the trees get above the protecting sea oats and
herbaceous growth.

is spring an experimental planting was made to
he fixation of the forward dune with sea oats
ola paniculata). Three staggered rows of rooted
s were set out about 7 feet apart over about
ourth mile of beach.

* * *

ade trees were planted for a distance of 38 miles
Alabama's State highways in the first quarter of
through joint effort of women's clubs, the State
vay department, the board of administration, and
ommission of forestry. Plantings were made in
y scattered locations. The stock, which was of
different species, was obtained from the State
ry, commercial nurseries, the woods, and the
ns of club women. In most cases the trees were
d 66 feet apart.

Texas Lumber Company Undertakes Large Project in Planting Slash and Longleaf Pine

The Angelina County Lumber Co., of Texas, ordered 20,000 slash pine and 180,000 longleaf pine seedlings from the State forest nurseries near Conroe and Kirbyville for use in a planting operation begun January 27, 1930, on cut-over land owned by the company near Nancy, Angelina County. This company planted 40 acres to longleaf pine in 1929. Its 1930 reforestation project is reported by the State forest service as the largest thus far undertaken in Texas.

This planting in Texas of slash pine, which has its natural range along the coastal plains of Louisiana, Mississippi, Alabama, Georgia, South Carolina, and Florida, is largely experimental. Satisfactory results have been obtained so far, however, in the planting of slash pine at the State forest near Kirbyville, Tex., where more than an acre was planted with this species as a demonstration project in 1926. Measurements made in July, 1929, showed that the trees had made an average height growth of more than 6 feet and that the maximum height growth for the plantation was 10.4 feet.

* * *

The city of Little Falls, N. Y., increased its forest planting stock order by 125,000 this spring in order to provide work for unemployed men. This addition would provide about 700 days' work. The city's total order was 325,000 trees, and was expected to increase the Little Falls watershed forest plantations to about 1,500 acres.

* * *

The Chemung County Rod & Gun Club, Elmira, N. Y., won the Whipple reforestation cup for 1929 with the planting of 75,000 trees. Of the 20 sportsmen's clubs that submitted records of reforestation work as competitors for the cup, those taking second and third place were the Southern New York Fish & Game Association, with headquarters at White Plains, which reported the planting of 47,000 trees, and the Ilion Fish & Game Club, which reported a total of 25,000 trees.

* * *

The plan promoted by the Detroit News for reforestation of State forest land in Michigan, which was described in the Forest Worker of January, 1930, has resulted in provision for the planting of at least 9,760 acres. Under this plan the State forestry division agreed to plant pines on 40 acres of State land for every $100 contributed toward the work by individuals or organizations. By February 15, $24,400 had been subscribed.

A State Forest Given to Texas

The State of Texas has received a gift of 600 acres of forest land near Warren, Tyler County. The donor is J. H. Kirby, of Houston. Mr. Kirby has provided that the land shall be used for scientific study of forestry in East Texas and that the net revenues derived from the sale of timber shall be used by the former students' association of the State agricultural college to create a student loan fund at that institution. The tract has been cut over and has on it but little merchantable timber, but does have a fair stand of second-growth longleaf pine.

This is the fourth State forest to be established in Texas.

* * *

California has a new State park comprising 3,000 acres of giant redwood forest in Del Norte County, in the northwestern corner of the State. Private contributions matched with funds from the State park bond issue made possible the designation of the new park, which has been named the Del Norte Coast State Park. The park is traversed by 5 miles of highway and includes more than 7 miles of ocean frontage.

* * *

In 1929 the fish division of the Michigan Department of Conservation planted 10,408,053 fry, advanced fry, and fingerling game fish and 34,368,900 fry, advanced fry, fingerling, and yearling commercial fish in the waters of the upper peninsula of that State. Of the game fish planted 50 per cent were brook trout and about 25 per cent were perch. Whitefish and lake trout were the principal commercial species planted.

Ohio has three new 65-foot steel fire towers read
operation—one on Atkinson Ridge, 2 miles north
of Zaleski, Vinton County; one on Woods Ridge, n
of Sciotoville, Scioto County; and one on Rock H
State Park, Hocking County.

* * *

A second branch office has been opened by the C
necticut Department of Forestry, in Willimantic,
District Forester Joseph Pike in charge. The offi
in the Jordan Building, 762 Main Street.

* * *

District headquarters of the Mississippi Fo
Service, to serve northern Mississippi, have b
established at Tupelo, with Assistant State Fore
H. C. Mitchell in charge.

* * *

In 1930 the Michigan Department of Conserva
plans to give added fire protection to Isle Royale,
Lake Superior, by erecting a fire tower and station
on the island a special fire warden equipped wit
large motor boat. Most of the island has no trail
roads permitting access to fires by land. Last y
three fires burned over 525 acres of its area, destroy
timber some of which was of merchantable size.

* * *

In the biennium ending June 30, 1929, the Mississi
Forest Service recorded 2,908 returns on its pr
releases. During the same period feature articles w
prepared by the service on request for most of the da
papers of Mississippi and for a number of newspap
and magazines in neighboring States.

Education and Extension

St. Lawrence University Develops Forestry Program

St. Lawrence University, Canton, N. Y., in following out its plans for forestry extension work made possible by a gift of $100,000 from F. L. Carlisle and Co. (Inc.), has created the position of associate forester in order to cooperate in county and private reforestation work in Oswego County, N. Y. William J. Endersbee, a graduate of the New York State College of Forestry who has been connected with the United States Bureau of Plant Industry as assistant pathologist engaged in blister rust control work, has been appointed to the position and is stationed at Pulaski, N. Y. Mr. Endersbee's principal duty will be to work with the refores
tion committee of the Oswego County Board of Sup
visors in acquiring and reforesting land under the p
visions of the Hewitt Act.

St. Lawrence University plans to reforest 90 ac
of land this spring, writes Floyd M. Callward, head
the university's forestry department. One hund
thousand trees ordered from the State conservat
department are to be planted on 40 acres along Lit
River, adjacent to the campus, and 50 acres of
Covey tract in Parishville. The latter area is to
used as a demonstration forest. Plantings will be
northern white, Norway, and Scotch pine, white and N
way spruce, northern white cedar, and European lar

e School of Forestry Holds Third Decennial Reunion

ore than 150 graduates of the Yale School of For-
t met at New Haven February 21–22 to celebrate
e school's thirtieth birthday. Twenty-six classes
e represented. In his welcoming address following
ss reunion luncheon Dean Henry S. Graves said:
e school has changed in many ways: In physical
ties, in educational policy, in the scope of its
ities, and in the character of its intellectual work.
underlying purposes of the institution remain
antially the same as 30 years ago." Speaking of
expansion of the physical plant of the school,
Graves described plans for two additions to
Hall—one to run east from the north end of the
ing, the other to extend south to join Sage Hall
the Osborn Botanical Laboratory. Resources for
east wing have been derived from the bequest of
ard A. Bowers, and the wing is to contain an audi-
m in memory of Mr. Bowers. He referred to the
lopment over a period of 25 years of the Eli
tney Forest, now more than 20,000 acres in extent;
e forest at Keene, N. H., and its development by
essor Toumey as an experimental and research
on; and to the 8,000 acres in northeastern Connect-
recently received as a gift from George Hewitt
rs. The permanent funds available specifically for
school of forestry now aggregate nearly $1,700,000,
about 90 per cent of the school's budget is covered
he resources available specifically for forestry work.
n Graves characterized the school's first decade
rgely formative; its second as devoted to strength-
g the courses of study, enlarging the scope of the
iculum, and evolving sound methods of organized
uction; and the third as one of liberalizing the
ational work, through abandoning the prescribed
iculum, enlarging and enriching individual courses,
ng new courses, and replacing formal class work
individualized work. Other members of the
stry faculty followed Dean Graves with talks on
r specialites.

anquet addresses were made by President Angell and
ord Pinchot.

n the morning of the second day R. Y. Stuart, Chief
he United States Forest Service, spoke on "The
ted States Forest Service and the profession of
stry."

nder the leadership of Prof. Ralph C. Hawley, an
rsion was made to the Maltby tract of the Eli
itney Forest to observe results of watershed plant-
and improvement cuttings in which successive
ses of students had participated under Professor
vley's direction. Norway pines planted by the
s of 1902, pruned to a height of 17 feet, have grown
diameter of 12 inches. The edges of the reservoirs
lined with a fine growth of evergreens.

Kansas City School Children Campaign Against Bagworm

For four years Kansas City school children have been studying and fighting the most destructive insect enemy of trees in their vicinity, the bagworm, Lena V. Feighner reports in Nature Magazine. At the beginning of 1926 a general science class in the Central Junior High School made a study of the insect, collecting bags from some trees on the school grounds and obtaining information from the Bureau of Entomology. Members of the class organized a campaign in their school, which in two weeks netted 28 pounds of bags. The class observed emergence of parasites, hatching of eggs, and habits of the insect. Later the project was extended to other junior high and grade schools in the city. The 1928 campaign, in which business men of the city offered silver cups as prizes, resulted in collection of 704 pounds of bags in Kansas City and vicinity. In 1929 prizes were again offered and the schools gathered 325 pounds of bags. Destruction of tree foliage by the bagworm has diminished, and there is evidence that a tree conservation lesson has been learned not only by the school children but by the general public.

Boy Scouts to Plant Nuts from Historic Trees

The American Forestry Association has collected a fund of $10,000 to be used in furthering forestry activities of the Boy Scouts of America. This fund is to finance a 5-year project in collecting and planting nuts from trees having historic associations. Information as to where historic nut trees may be found will be given to the scouts by the Department of Agriculture and by State foresters and historical societies. Nuts gathered by the scouts will be sent to the experimental farm of the Department of Agriculture at Arlington, Va., where they will be sorted, tested, and hulled. National Boy Scout headquarters will arrange the distribution of allotments of nuts to scout troops in regions to which the different species are adapted. Each consignment of nuts will be accompanied by instructions for planting the nuts and caring for the seedlings.

* * *

The department of forestry of the North Carolina State College of Agriculture, established in the fall of 1929, is carrying on field work on the Camp Polk prison farm, which includes about 1,000 acres of timberland. An intensive cruise of about 50 acres has been made this year, and on this area timber is being cut under supervision of the department, the prison providing the labor.

The Wisconsin Junior Forest Rangers

In 1929 F. G. Wilson, extension forester of Wisconsin, had 860 boys in 24 counties enrolled in his junior forest ranger clubs. These boys planted 325,000 tree seedlings provided by the State conservation commission. The junior rangers' annual camp at Wildcat Lake, for which the conservation commission has provided building and equipment, was attended by 63 boys from 13 counties.

The program of woodcraft and forestry work which a Wisconsin boy undertakes when he joins the junior forest rangers is an ambitious one. It is divided into four orders; from the initial grade of "forestcrafter" the persistent and successful junior ranger progresses to those of planter, woodsman, and cruiser.

The "forestcrafter" must learn to identify the important trees of his locality by bark, fruit, bud, and foliage, and to make drawings, offhand, showing the characteristics of the leaves or the needle clusters of 11 tree species; must mount specimens of the foliage and fruit of 10 trees of commercial value in Wisconsin; must observe and teach care in the use of camp fires; and must pass an examination on forest resources of State and Nation, the location of forest areas, the uses of wood, and the effect of forests on stream flow and wild life. He must make a Biltmore stick and learn how to use it, learn to estimate the diameter of trees, and plant 300 seedlings provided by the State. He must keep a complete record of all this study and work.

The planter is required to continue the work of forest protection, making the acquaintance of the fire warden and game warden of his fire-protection district, learning the warden's protection plans and the boundaries of his territory, and offering to help in some fire-protection work. He must construct a forest nursery, following printed instructions, and plant, under supervision, 600 tree seedlings furnished by the State conservation commission. These seedlings are provided on condition that the 300 seedlings planted in connection with the forestcrafter program have been handled with all reasonable care, and that a map is drawn up giving the location of the planting area with respect to other farm plots or the home, showing also plantings already made and projected. He must prepare, mount, and exhibit in some public place ten specimens of wood of trees of commercial importance in his locality, and must learn what woods are best for various uses. He must learn the soil, moisture, and climatic requirements of 11 tree species and must be able to draw the fruits of an equal number, also to draw a diagram of a typical tree and tell the function of each of its parts. He must talk to a school or class or at a public gathering on some phase of his work as a planter, and take part in making a success of Arbor Day or Forest Week observance.

The woodsman must continue forest protection service and forest planting. He must learn to tie quickly at least 10 kinds of knots and to pace distan with reasonable accuracy, must make a caliper, a must make a collection of insects or of fruit of for trees. In this order, also, comes the manageme under supervision, of a woodland area.

The cruiser, while carrying on the planting and ot features of his earlier work, must familiarize him with the various units of measurement used with for products and learn to estimate the contents of stand trees and of piles of logs.

For each of the grades a wide variety of optio work is outlined.

All Wisconsin boys 12 to 21 years of age are adm sible to the junior forest ranger clubs.

Fire Prevention Poster Contest in Michigan Schools

All Michigan grade and high school children ha been invited to try their ingenuity at produci forest-fire prevention posters and slogans for the State use, in a contest closing March 31. Cash prizes tot ing $110 are offered by the State department of co servation to the five high-school pupils and the fi grade pupils whose results are adjudged most effecti with additional awards of $10 worth and $5 worth books, respectively, to the high school and grade scho attended by the first-prize winners. Ratings are to b based half on the poster and half on the slogan, and t merits of the idea expressed are to be the determini factor rather than the quality of the drawing.

Oratorical Contest on Forestry for Tennessee School Children

More than 100 children in the grade schools Fentress County, Tenn., competed last fall in oratorical contest on the subject "What will well-pr tected forests mean to Fentress County?" The co test was arranged by District Forester Tom B. Watkins, with the cooperation of County Superi tendent of Schools O. O. Frogge, and was open to pupils enrolled in the fifth to eighth grades, inclusiv Printed matter specially prepared for the purpose w distributed to school principals by the State division forestry in numbers sufficient to supply every eligib child. Oration length was set at from 8 to 12 minute and contestants were graded 60 per cent on subje matter and 40 per cent on delivery. After prelimina contests in the individual schools semifinals were he at the centers of the various civil districts of t county. The final contest took place in the aud torium of the Alvin C. York Agricultural Institut Jamestown, Tenn. Prizes of $15, $10, $5, and with a history of Fentress County were award according to the decision of a committee headed State Forester R. S. Maddox.

iana Manufacturer Distributes Tree Seed by Millions

ank S. Betz, retired manufacturer of Hammond, in the year beginning with July, 1928, personally ibuted 14,550,000 trees and tree seed to school ren, Boy Scouts, corporations, farmers, and others ifferent parts of Indiana and in other States. t of these trees and seed were given away; the re- der were sold at cost. More than 2,000,000 of the were given to school children in Lake County, More than 90,000 Indiana school children took in the planting. This spring Mr. Betz has ar- ed to give away 25,000,000 pine and spruce seed ral boys of his State and also to distribute 5,000,- one, two, and three-year-old pine, spruce, fir, cy- s, cedar, and arborvitae trees to school children and Scouts. With each package of seed go illustrated ting instructions adapted to the understanding of ild. Stimulated by Mr. Betz's example, bankers ake County have arranged to give approximately 0,000 evergreen tree seed to school children of the ty for planting this year on Arbor Day, April 18.

lowships to be Awarded by Charles athrop Pack Forest Education Board

he Charles Lathrop Pack Forest Education Board, ntly founded by the Charles Lathrop Pack Forestry st, has offered six to eight fellowships for the year 0–31, the grants under which are to range in general n $500 to $2,500. The purpose of the fellowships encourage men who have shown unusual intellec- and personal qualities to obtain training that will equip them for responsible work in the general ctice of forestry, in forest industries, in the teaching orestry, in forest research, or in the development of lic forest policy. The fellowships will ordinarily restricted to men of American or Canadian citizen- ; no restrictions are made as to age, educational us, or practical experience. Men still in school and already engaged in professional work who intend make forestry their life work are eligible. Grants be made for study at a school of forestry or an itute of research, on a forest under management, in ociation with a forest industry, or in travel. Appoint- ts may be made for 12 months or for a longer or rter period, and may be renewed. Those wishing to ly for fellowships were asked to do so on or before il 15, 1930.

enry S. Graves is chairman of the board and Ward pard is its secretary. The directors are Samuel T. a, John Foley, Henry S. Graves, Arthur N. Pack, rd Shepard, E. O. Siecke, Ellwood Wilson, Hugo kenwerder, and Raphael Zon. Headquarters of board are at 1214 Sixteenth Street NW., Washing- , D. C.

Idaho Black Locust Windbreak Timber Brings Return of $50 an Acre

A black locust windbreak in the Twin Falls tract of southern Idaho that was harvested in the winter of 1927–28 gave a financial return of about $50 per acre per year for the land occupied, this return including compensation for damage to field crops through competition, writes Extension Forester A. M. Sowder. The windbreak, located near Filer, was a single row, one-quarter mile long, of trees spaced about 8 feet apart. A highway bordered it on the west and a field on the east. For half its length there was no ditch between the trees and the adjacent field, so that the trees damaged the field crop through competition. The damage was evident to a distance of about 40 feet, although the crop on this strip was by no means a total loss. The remaining half had an irrigation ditch between the trees and the crop to convey the waste water from the field. Here there was practically no damage to the crop. Thus slightly more than half an acre of ground was taken up by the trees in this quarter-mile windbreak. The financial return to the owner for the timber was a little more than $500, or about $50 per acre per year. The limbs of fuel wood size and the very crooked lengths were not utilized, but burned as débris, so considerable revenue was lost. In addition, many posts had been obtained from the windbreak from time to time of which no record was made.

Plans for Spring Planting in Nebraska

Pine seedlings distributed this year to Nebraska farmers by the extension service of that State will be shipped directly to the farmers from the nursery at Halsey, Nebr., instead of being shipped to the agricultural college at Lincoln to be counted and reshipped. The old procedure caused a week's delay and some drying out of the roots. Broad-leafed stock will be handled at Lincoln as before.

Inspections during the past summer of 719 plantings, including some from 1926, 1927, 1928, and 1929 distribution, showed the survival to be slightly less than 50 per cent, Extension Forester Clayton W. Watkins reports, the loss being heavier in evergreen stock. The abnormal loss may be partly explained by extremely dry weather experienced during parts of the last four summers.

Five hundred thousand pines are available at Halsey for distribution this year. The extension service has raised its annual quota of trees per applicant for windbreak planting from 300 to 400. For farm woodland planting 1,000 trees are offered to each applicant.

* * *

In December, 1929, the New York State Ranger School graduated 44 men, the largest class of its history.

The West Virginia Game, Fish, and Forestry Commission this season has sponsored its first county forest-fire essay contest, in the schools of Randolph County. Arrangements were made by District Forester H. Y. Forsyth and County Superintendent of Schools Bryan Hamilton. School children were given their choice of the subjects "Forest fires and their relation to the people of Randolph County" and "What can my school do to assist in the elimination of the forest-fire danger?" The county was divided into three districts, in each of which were offered first, second, and third prizes of $5, $3, and $1, respectively. In addition a county prize of $5 was offered for the most original essay.

* * *

Members of the 4-H clubs in North Carolina can obtain forest-tree seedlings from the State nurseries this year with no charge other than for packing, under the terms of an offer made by the State department conservation and development and the State agricu tural college's extension service. As many as five applications from each county will be accepted, for 50 or 1,000 trees each. The packing charge is 50 cen for each order. Longleaf pine, loblolly pine, and blac locust are the species offered.

* * *

A course in aerial mapping has been organized Syracuse University for students of applied science an the New York State College of Forestry. It is head by Prof. S. D. Saranson. Others on the staff are Pr Leon B. Howe, instructor in drawing, Prof. Leroy Mullin, and Prof. Earl F. Church, formerly with t United States Coast and Geodetic Survey. The cour is being financed under an endowment totaling appro mately $60,000 from the Guggenheim Foundation the promotion of aeronautics.

Forest Service Notes

Seed Yield Averages for Southern Pines

By PHILIP C. WAKELEY, United States Forest Service

As a by-product of various germination and storage tests with seed of the southern pines the Southern Forest Experiment Station is now able to give, for each of the principal species, fairly reliable figures on such points as the average number of seed in a pound and the average yield of seed from a bushel of cones. The available data, representing records of seed from 8 or 10 crops and from such widely separated States as Georgia, Florida, Arkansas, and Texas, are too meager to permit grouping by regions or by climatic cycles. Nevertheless, figures derived from them are useful in making estimates of the quantities of cones or see required for planting given areas, of the shippi weights of cones, and of loads on cone-storage floor drying-rack brackets, and extractor-drum axles. The figures have interest, also, in connection with the deve opment of extraction technique and with the proble of what constitutes a good seed tree. They have ther fore been summarized in the following table, "usu averages" being followed in parentheses by the minim and maxima observed at the station for lots of con and seed not affected by immaturity, loss of seed befo collection, improper extracting technique, or abnorm insect injury.

Species	Number of clean seed per pound [1]	Number of green cones per bushel	Weight per bushel of green cones [2] (pounds)	Yield of seed per bushel of green cones [3] (pounds)	Per cent of weight lost by cones in drying (based on dry weight) [2]	Per cent of weight lost by seed in cleaning (based on clean weight) [3]	Per cent of seed with kernels (base on total number)
Longleaf pine (*Pinus palustris*)	5, 200 (4, 010–8, 000)	100 (86–118)	34 (28–38)	1. 50 (1. 00–1. 93)	105 (87–115)		80 (57–86)
Sonderegger pine (*Pinus sondereggeri*)	13, 400 (12, 730–14, 138)					27. 8 (Only 1 record.)	83 (Only 1 recor
Slash pine (*Pinus caribaea*)	15, 500 (13, 470–19, 660)	216 (Only 2 records.)	34 (Only 2 records.)	1. 20 (1. 00–1. 43)	80 (Only 2 records.)	31 (27. 4–41. 9)	80 (61–85)
Loblolly pine (*Pinus taeda*)	21, 300 (17, 241–29, 264)	500 (393–1080)	32 (26–35)	1. 30 (0. 81–1. 74)	74 (54–93)	26 (16. 0–37. 6)	65 (37–77)
Pond pine (*Pinus rigida serotina*)	56, 000 (53, 230–61, 250)	350 (Only 1 record.)	31 (Only 1 record.)				
Shortleaf pine (*Pinus echinata*)	69, 200 (41, 614–84, 985)	2, 200 (1, 444–2, 545)	37 (30–42)	1. 30 (0. 83–1. 83)	75 (36–98)	30 (19. 5–56. 8)	68 (42–83)
Sand pine (*Pinus clausa*)	74, 400 (70, 280–78, 550)					53 (Only 1 record.)	
Spruce pine (*Pinus glabra*)	77, 500 (Only 1 record.)					51 (Only 1 record.)	

[1] Figures are for seed from which all impurities, including aborted or broken seed, have been eliminated, and, except in the case of longle from which the wings have been removed.

[2] Green weights of cones are probably a trifle low, because they were usually obtained at the extracting plant instead of in the woods. Th give a fair approximation of shipping weights.

Figures are for "commercially clean" seed containing a varying quantity of impurities, but with wings removed except in the case of longle he opening of green cones is shown by the records esult in expansion to two or even three and one-half es the volume of the unopened cones. In distribut- n cones on the drying racks allowance should be made the maximum expansion. Drying racks should be proximately 4 inches deep for shortleaf, 6 inches p for loblolly and slash, and 8 inches deep for long- pine cones; at least, they should clear by these asurements, bottom to bottom, when arranged in s. With such clearance a 2 by 4 foot rack will hold ushel of green cones of longleaf, three-fourths bushel slash, one-half bushel of loblolly, or three-eighths hel of shortleaf pine cones.

f the four species just listed longleaf pine cones take longest time to open, as might be expected from the ucture of the cone and the large amount of water be removed in drying. Shortleaf cones seem to be most apt to open poorly; some lots of shortleaf give trouble, but others are exceedingly stubborn.

reeing the seed from their wings is less difficult with sh than with either of the two other commercially portant species for which this is usually done (long- f pine seed are not "winged"), and is much the most ficult with loblolly.

Experience at the southern station has shown that e needles are more easily and cheaply removed fore the cones open. When the needles are once oken and mixed with the extracted seed, it is difficult impossible to get them out.

t may be remarked that under ordinary nursery con- ions the germination percentage of fresh southern ne seed approaches very closely the percentage of ed containing kernels, and that the stand of seedlings most southern nurseries is too dense.

ew Method of Preservative Treatment Makes Engelmann Spruce Available for Use as Railroad Ties

One of the most perplexing forest utilization prob- ms of the Engelmann spruce regions was recently lved when the Forest Products Laboratory demon- rated the possibility of giving wood of this species reservative treatment fitting it for use as railroad ties. he treating methods formerly used for this wood did ot give satisfactory penetration either in sapwood or heartwood. Consequently the railroads accepted ly limited quantities of it, and that under some pro- st. This has complicated the problems of managing rests in Colorado, Wyoming, and Utah containing rge quantities of Engelmann spruce, for which there s been a very limited market.

The new method of treatment after being evolved at e Forest Products Laboratory, Madison, Wis., was emonstrated by J. D. MacLean, of the laboratory aff, at the creosoting plant of the National Lumber Creosoting Co., Salida, Colo., with narrow-gage and andard-gage Engelmann spruce ties furnished by the Denver & Rio Grande Western Railroad Co., and later at the Union Pacific Railroad's treating plant at Pocatello, Idaho.

The method involves careful control of the treating temperature, the treating pressure, and the pressure period. Either zinc-chloride solution, coal-tar creosote, or creosote-petroleum mixtures may be used. Regardless of the treating pressures employed, preservative temperatures of about 190° to 200° F. are necessary.

Doctor MacLean's tests at Salida showed that the air-seasoned Engelmann spruce ties on hand there could be given a creosote penetration of about one-third inch in the heartwood and more than one-half inch in the sapwood. The ties treated at Salida were not incised. The preservative used was a mixture of 55 per cent grade 1 coal-tar creosote and 45 per cent petroleum oil. In all but one of the treatments a total pressure period of about six to eight hours was used in order to have pressure applied about four to six hours under the maximum temperature. In most of the treatments preliminary air pressures of 25 and 30 pounds were used.

The ties used in the experiments at Pocatello were incised by running them through a machine that punches holes or slots in the surfaces, with the result that much better penetration was obtained. In all the experiments at this plant the preservative used was the standard mixture employed at the plant, 50 per cent petroleum oil and 50 per cent grade 1 coal-tar creosote. In all these tests the total time of treatment was less than eight hours, even when a final vacuum period of one and one-half hours was used.

In order to avoid injury from collapse and checking, it was found, the difference between the preliminary air pressure and the treating pressure should not be much above 125 pounds.

Because of the long time that would be required to season Engelmann spruce ties by artificial means in the treating cylinder preparatory to treatment with preservative oils, Doctor MacLean observes, air seasoning is much more practical and economical.

Zinc-chloride solution was found in the laboratory experiments to penetrate Engelmann spruce very much better than preservative oils. Under treating conditions such as are recommended, the solution completely penetrated the sapwood and gave average penetrations of one-half inch and more in the heartwood of both green and seasoned unincised material. Since this species takes much deeper penetrations of the water solution than of preservative oils under the same conditions of treatment, consideration should be given to the possibility of employing a 2-movement treatment for ties. The zinc chloride could be used to protect the wood against decay, and petroleum oil alone might be found suitable for protection against checking and splitting and to help retard leaching of the preservative salt.

Thinning Lodgepole Pine Stands on the Minidoka

By S. S. Stewart, United States Forest Service

In lodgepole pine stands on the Minidoka National Forest, Idaho, silvicultural operations have been developed to an advanced stage. This has been made possible by the fact that on the agricultural lands tributary to the forest there is a widely distributed population demanding forest products ranging from sawlogs to fence stays. Numerous small communities building up from a pioneer stage have required millions of board feet of logs, poles, posts, stays, fuel, etc. Dry material, much sought after owing to ease of handling, has been completely utilized, and within the last decade the demand for green material has steadily increased. This has permitted silvicultural improvement of the stands through the removal of diseased, defective, and inferior trees and through genuine thinning of stands approaching stagnation in growth.

Cutting plans have been developed for each ranger district, on the basis of detailed surveys. In these plans definite areas are listed according to age, density, or diseased condition of the timber. Sales will be directed into these areas for the next five or ten years, or until the timber on them is satisfactorily thinned.

While the present stands of lodgepole pine on these areas are largely immature and crowded, the trees have reached diameters of 3 inches or more and are merchantable for small building logs, fence poles, hay derricks, etc. Through the removal of part of the stand an immediate financial return is realized. The cutting is done by the farmers under timber-sales permits or contracts and at a fair return to the Government for its stumpage. The quantities of merchantable timber thus taken out vary widely but probably range from 50 to 250 trees per acre, depending of course upon the original density of the stand. Stumpage values for the material removed range from $2 or $3 to as much as $25 or $30 per acre. The demand varies somewhat from year to year, depending on the success or failure of the leading agricultural crops. Trees 3 to 9 inches in diameter marked for removal from all stands on the forest scheduled for cutting totaled about 29,000 in 1928 and about 20,000 in 1929.

In selecting individual trees to be cut attention is centered on removing trees of poor form and those infected with mistletoe or other diseases, and on obtaining uniform spacing, so far as possible, in the residual stand. The degree of density of the remaining stand is determined largely according to its age, the soil conditions, and general windfirmness. A long, slender stem with a mere tuft of limbs at the top is almost certain to be windthrown or to be bent over when laden with snow. These dangers are largely eliminated when the poles have grown to diameters of 5 or 6 inches. The best crowns are well balanced all around and occupy from one-third to nearly one-half the length of the tree. From 250 to 500 trees per acre are left. In terms basal area this amounts, for the few cases calculated, from 130 to 140 square feet per acre.

An administrative provision requires that purchase meet the ranger on definite days of the week or mont at given points on the district for discussion of th conditions governing the sale—its contract provisio and the principles of selecting and marking the trees.

By opening up the stands and freeing them from di ease these cultural operations hasten maturity of th major crop by from 20 to 50 years, besides greatly improving the quality of the final product.

No effort has been made to extend thinnings in stands in which the trees have not yet reached me chantable size.

Mortality on Cut-over Western Yello Pine Areas of the Southwest

In order to obtain some definite figures on mortalit losses, the greatest element of uncertainty in predic ing timber yields in the Southwest, Hermann Krauch associate silviculturist at the Southwestern Fore Experiment Station, has studied 15 and 20 year record of five sample plots on the Coconino and Tusaya National Forests, Ariz. All the plots are in cut-ove stands of western yellow pine. The two largest, cove ing 304 and 456 acres, respectively, were established i 1909. The three others, measuring 112, 139, and 15 acres, respectively, were established in 1913. Th stands after cutting ranged from 1,873 to 4,510 fee board measure per acre; the number of trees abov 12 inches in diameter at breast height ranged from 3 to 13.7 per acre and the diameters ranged as high a 47 inches.

Average annual losses per acre on the two plot established in 1909 were found to have been 8.8 an 20.3 feet board measure, representing annual mortality percentages of 0.36 and 0.58, respectively. Fo the three plots established in 1913 the average annua losses per acre were 17.7, 19.8, and 29.1 feet boar measure, and the corresponding percentages were 0.6 1.06, and 0.65. Trees above 30 inches in diamete at breast height showed the highest mortality rat both as to number and volume, except on one are where the rate was higher for trees 21 to 30 inches i diameter than for those 31 to 40 inches in diamete No marked consistency was apparent in the loss durin different 5-year periods after cutting. The two 20-yea plots showed a progressive increase from the first t the fourth period. Of the three 15-year plots, tw suffered their greatest loss in the first and one in th third period.

On all but one of the plots a greater number of tre deaths was charged to mistletoe than to any othe agent. The percentages of the deaths attributed t this cause on the five plots were: 20-year plots, 0 an

5 5-year plots, 48, 29, and 46. Corresponding per- enages for wind throw and wind breakage were 19, 5, 8, 30, and 26. Lightning ranked third as a cause eath, with percentages ranging from 5 to 13. In oit of volume wind was responsible for the greatest s and lightning for the next greatest; both these gts act mainly on large trees, while mistletoe kills lively few large trees.

Weding of Sprouts Justified Where Northern White Pine is Planted to Replace Chestnut

is worth while to weed hardwood sprouts from hern white pine planted on areas where chestnut been killed by blight, according to results obtained the Mount Toby Demonstration Forest of the ssachusetts Agricultural College, at Sunderland, ss. Paul Stickel, of the Northeastern Forest Exper- nt Station, recently reported the condition of ple plots located on this forest which have been ntained by the station in cooperation with the ege since 1924. Two plots are in a northern white e plantation that was established when the dead stnut was removed in 1919. A third plot is situated stand in which the blight-killed chestnut trees have been removed. On one of the artificial replace- nt plots the competing hardwood sprouts have been back annually so as to release the pines. Measure- nts have been made annually on all plots since ir establishment.

he 1929 measurements showed that the basal area the northern white pine on the planted plots is rap- approaching that of all species on the natural lacement plot. The basal area per acre for northern ite pine was 15.9 square feet on plot I (weeded pine t) and 11.3 square feet on plot II (unweeded pine t); the basal area per acre for all species was 16.2 are feet on plot III (natural replacement plot). the natural replacement plot less than 50 per cent the stand was made up of commercially valuable cies.

n 1929 the trees on the weeded plot had an average meter of 1.8 inches and an average total height of 7 feet, and approximately 70 per cent of them were the dominant and codominant classes. On the un- eded plot, measurement of northern white pines in same year showed an average diameter of 1.6 hes and an average total height of 11.3 feet; and y 50 per cent of the pines on this plot were in the minant and codominant classes. The weedings have ot down the height of the hardwood sprouts so that the pines on the weeded plot overtop the hardwood opy by almost 3 feet; on the check plot the sprout wth overtops the conifers by 3 feet.

hus it appears that weeding of hardwood growth pine plantations on cut-over chestnut lands, while not absolutely necessary, aids materially in the best development of the planted stock. Where such weeding is undertaken Mr. Stickel recommends that a "broadcast" thinning cutting back all hardwood sprouts) be made in the first year and that in subsequent years thinnings be confined to releasing individual pines. In the study here described a "broadcast" weeding was carried out in 1925, requiring 32 man-hours per acre, and in each year since than a clump weeding requiring from 6 to 8 man-hours per acre.

Pulpwood Sale of 2,000,000 Cords Offered on Colorado National Forests

A timber sale that would enable Colorado for the first time to take rank as a large-scale producer of pulp timber is now being advertised by the Forest Service. The offer, based on an application from a responsible paper manufacturer, covers 2,000,000 cords of pulpwood on the Rio Grande and San Juan National Forests, in the southwestern part of the State.

Operations under the contracts offered would increase the total annual cut on the national forests of Colorado by approximately 50 per cent. If the annual cut on these forests were increased by 400 per cent it would still remove no more timber than would be replaced annually by natural growth. The operation has been planned so that it can continue indefinitely, covering in rotation a number of tracts large enough so that when the last tract is cut over the first will be ready with a second crop.

Two units make up the "chance" now advertised for sale to the highest bidders—one on the south fork of the Rio Grande, with an estimated total of 1,025,000 cords of Engelmann and blue spruce and 215,000 cords of white and alpine fir, and one on the upper Piedra River, with 800,000 cords of spruces and true firs. Each unit includes saw timber of Douglas fir, western yellow pine, limber pine, and bristlecone pine.

* * *

In forest plantings of 1929 in the Northern National Forest District, headquarters of which are in Missoula, Mont., western white pine seed gathered from 17-year-old trees showed a germination percentage of about 27, and that gathered from trees 100 to 120 years old showed one of only about 19. Seed from mixed collections of cones taken from squirrel caches was only 22 per cent viable. D. S. Olson, chief of planting for the district, concludes that seed from the first cones borne by young western white pines may be viable and that natural seeding may commence with the production of cones on such trees. Because of a poor seed crop and for other reasons the comparison was not extended to species other than western white pine during 1929.

Forest Service Celebrates Twenty-fifth Anniversary

On February 1, 1930, the United States Forest Service became 25 years of age. Birthday celebrations were held both in Washington, D. C., where members and friends of the service met for afternoon exercises in the auditorium of the National Museum, and in field offices. For one hour the proceedings of the Washington meeting went on the air over a coast-to-coast radio network of 30 stations furnished by the National Broadcasting Co.

An extensive collection of lantern slides from old Forest Service photographs, some of which exhibited present service administrators in their juvenile stages, were shown and explained at the Washington meeting by E. E. Carter, chief of the branch of forest management. Three of the four men who have served as chief of the service were on hand, and a message was received from the one absent, William B. Greeley. The present chief forester, R. Y. Stuart, presided, and opened the speaking program with a review of the high points of forestry progress in the United States in the last quarter century. Assistant Secretary of Agriculture R. W. Dunlap conveyed the greetings of the department and called attention to the relationship of forestry to agriculture. Senator McNary of Oregon spoke of the benefits that have accrued to the West from the skillful administration of the national forests and expressed his belief in extended acquisition of lands for national forests. He congratulated the service on its administrative success and its winning of public confidence, and on its present opportunities. Representative John D. Clarke of New York reviewed legislative milestones in the progress of forestry and called attention to the new Clarke-McNary bill proposing a still larger program of Federal land acquisition and reforestation. Representative Roy O. Woodruff of Michigan described the forest problem in the Lake States. Representative Scott Leavitt of Montana, once a forest ranger, expressed his gratification over the progress of Federal forestry legislation and the prospect that more adequate funds will be provided for Federal forestry work. Representative Harry L. Englebright of California stressed the forest problem of the West and the need for more adequate fire protection. Former Chief Forester Henry S. Graves spoke of the elements contributing to the success of the work of the Forest Service and of the influence of this success in stimulating State and other forestry undertakings. Gifford Pinchot, first chief of the service, spoke in reminiscence of "the days when the forest lands of the Government had not a single forester to look after them and the foresters of the Government had not a single acre of Government forest land in their charge," and made a plea for conservative handling of forest resources.

The Forest Service was created in 1905 through the merging of the old forestry division of the General Land Office and the Bureau of Forestry of the Depa ment of Agriculture.

Sitka Spruce on the Tongass Fore Looks South

By R. F. Taylor, United States Forest Service

It is realized that in regions farther north or greater elevations than a given tree's optimum grow region the species will seek south slopes, and vice ver In the case of Sitka spruce the exact location of the be growing region along the northwest coast is probab not known. It would be interesting to locate a zo where, other factors being equal, the species grows well on one aspect as on another.

In going over some data on cut-over land on th Tongass National Forest, in southeastern Alaska, noted that of 13 timber sales only 3 had occurred northerly slopes, and these had a low percentage spruce. With this for a starter I investigated areas on which yield studies had been made. On the areas southerly aspects supported 56.2 per cent spru on the average, and had an average site index of 73 (based on total height at 50 years). North and nort east slopes had but 22.37 per cent spruce and an avera site index of 67.5. On southern slopes the site ind varied from 60 to 92, whereas on northerly slopes varied from 40 to 70.

Where is the Mecca toward which the Sitka spru bows? Does it lean toward the cold Tongass rains the fog belt of the Northwestern States?

New Films Show Growth Requiremen of Forage Plants

Two one-reel motion picture films have been pr pared by the Forest Service in cooperation with t Motion Picture Laboratory of the Department Agriculture to tell the story of grazing on the ran as related to plant growth requirements. One, titl "On a Thousand Hills," deals with sheep grazing; t other, titled "Green Pastures," with the grazing cattle. Most of the photography was done by fore officers on range areas in the intermountain regi and in the Southwest.

In these films interest centers on the forage rath than on the livestock. Plant reactions to vario types of grazing are shown, such as the stunted r growth of overgrazed forage. Grass is shown growi before the lens, and certain other phases of plant l are presented.

On a Thousand Hills is already available, and Gre Pastures will be released within a few weeks. The films may be borrowed free of charges, other than t cost of transportation, by application to the Office Motion Pictures, United States Department of Ag culture, Washington, D. C.

erimental Area Designated on Coconino National Forest

area of 2,420 acres within the Coconino National t, Ariz., has been designated as an experimental and will be administered by the director of the iwestern Forest Experiment Station, with the cooperation of the forest supervisor. Most phases of forest administration will be practiced on the area; special use permits will remain in force, a sheep-driveway will continue, grazing permits will be issued as fencing progresses. No permits of a permanent or semipermanent character will be issued, however. Timber cutting on the area will be subordinated to silvicultural experimentation.

General Forest News

Forest Insects in 1929

By F. C. Craighead, United States Bureau of Entomology

A report prepared for publication by the Insect Pest Survey)

e infestation of the western pine beetle (*Dendroc- brevicomis* Lec.) in southeastern Oregon and eastern California declined in 1929 by from 40 per cent. This infestation had been gradually ing up for the past seven years and had reached ık in 1928. Over rather extensive areas losses is period ranged from 3 to 12 per cent of the ; occasionally on more restricted areas from 50 per cent of the timber was destroyed, totaling many millions of feet. The remarkable decline 29 is attributed largely to increased growth of rees during the 1928 season, made possible by eserve of moisture built up by the heavy precipi- during the spring of 1927.

merous outbreaks of the mountain pine beetle *lroctonus monticolae* Hopk.) again were reported 29 in California, Oregon, Idaho, Montana, and ning. The infestation of great magnitude com- ed upon a year ago, involving the Bitterroot, erce, Salmon, and Beaverhead National Forests, ot markedly change in 1929. This infestation, ng hundreds of square miles, continues to advance gh the lodgepole areas of these forests and unless hing unforeseen develops will eventually destroy cally all the merchantable timber on these areas. ious efforts have been made by the Forest Service ep this infestation from spreading southward and ard into the great body of lodgepole pine in the wstone National Park and surrounding national s—the Gallatin, Madison, and Wyoming. Con- perations were begun in many localities, and it mated that some 50,000 infested trees on these will be treated during the winter and spring of The infestation by this species in the Crater National Park, Oreg., still presents a serious em, and a few local outbreaks have been re- l in the Sequoia National Park, Calif. The latter e treated in 1930.

estations of the mountain pine beetle in western pine were markedly on the increase in the northern Rocky Mountain region during the past year. This is especially true of the Kootenai National Forest, Mont., and the Coeur d'Alene National Forest, Idaho. It has been recommended to the Forest Service that some 50,000 trees be treated on these areas. Infestations on the Kaniksu National Forest, Wash.-Idaho, and the Pend Oreille National Forest, Idaho, have reached such proportions following forest fires of the past two years that efforts to control them are deemed hopeless.

Only two outbreaks of the Black Hills beetle (*Dendroctonus ponderosae* Hopk.) were reported in 1929. One on the Colorado National Forest, Colo., involved about 500 trees composing marginal groups around the main infestation, which was put under control in the past two years. A few yellow pines were reported attacked on the [illegible] National Forest, Utah.

Preliminary reports indicate that 1929 control work materially checked the vigorous outbreak of Dendroctonus barberi Hopk. on the Prescott National Forest, Ariz., against which the Forest Service had been working for the past two years.

The spruce budworm (*Cacœcia fumiferana* Clem.) continued to be a serious pest in many regions. The lodgepole infestation involving 75 to 100 square miles in the southwestern portion of the Yellowstone National Park and the adjoining Targhee National Forest, Idaho, continued unabated, although in areas that had been infested for three years there was evidence that the number of insects had markedly diminished and that relatively few trees would be killed. Forest officers report reduction in numbers of this insect on the Idaho and Payette National Forests, Idaho, where it has been especially destructive to fir in the past few years. The outbreak centering along the Shoshone Canyon and east entrance to the Yellowstone continues unabated. Apparently a considerable percentage of the fir in this canyon will be killed. Other outbreaks in the Yellowstone have almost completely subsided. Some local feeding was found in the fir type of the Coeur d'Alene National Forest, Idaho, and the Colville National Forest, Wash. In the jack pine forests near Higgins Lake, Mich., this insect has continued active and has done considerable damage, although no accurate estimates of abundance or injury are available. The outbreak in the vicinity of Itasca Park, Minn., has not caused much damage since 1925. In northeastern Minnesota fir and spruce trees are still dying as a result of an outbreak starting in 1918, but no defoliation has been observed the last two seasons.

The widespread killing of Abies concolor and A. magnifica by Scolytus ventralis Lec. in the Sierra and Cascade Mountains in California and Oregon showed little tendency toward reduction. The recent outbreak first attracted attention in 1924.

A rather startling local outbreak of an unknown sawfly has been reported on spruce in the vicinity of Old Faithful and The Thumb in the Yellowstone National Park.

The needle tyer (*Eulia* sp.), which destroyed so much lodgepole pine timber in the vicinity of West Yellowstone, Mont., has now almost completely disappeared.

During the past year our attention was called to serious injury to Douglas fir along the Gallatin River, Mont., thought at first to be caused by Adelges cooleyi Gillette. Examination showed that the Adelges was only a contributory cause, and the reason for the loss of foliage is at present obscure. There is some evidence that a spider mite infestation in 1928 was the chief cause. This mite is now injuring Douglas fir in several places in the Yellowstone Park region.

A local outbreak of Dryocoetes confusus Sw. in alpine fir was reported near Duck Lake, Yellowstone National Park, under conditions indicating that this species is actually a primary enemy of fir in this vicinity.

An outbreak of an undetermined moth (probably *Ellopia* sp.) that defoliated great numbers of true fir and Douglas fir at Cloudcroft, N. Mex., in 1928 was less destructive in 1929.

The parasite Campoplex frustranae Cushman has shown remarkable increase during the past three years in the pine plantations at Halsey, Nebr., into which it was introduced in 1926. At points of parasite introduction the tip moth infestation has been reduced during this period by from 33 to 92 per cent.

The hemlock budworm (*Peronea variana* Fern.) has defoliated western hemlock over an area of 150,000 acres on the Olympic peninsula of Washington. It is not thought that the trees will die unless heavy feeding on needles is continued in 1930.

* * * (Here Doctor Craighead noted the progress of the outbreaks of the fir tussock moth, discussed in this number of the Forest Worker by R. E. Balch.)

The southern pine beetle (*Dendroctonus frontalis* Zimm.) again was locally destructive during 1929. The outbreaks were in all cases associated with marked deficiency in precipitation, and in many cases group killings centered around lightning-struck pines. Local outbreaks have been reported throughout the Piedmont and Blue Ridge sections of Virginia, North Carolina, and South Carolina.

The range tent caterpillar (*Malacosoma f* Streck. [?]), which in 1928 caused very extensiv widespread defoliation of bitter bush and other f shrubs on the eastern slopes of the Cascade and Mountains, was markedly less abundant in 1929.

The boxwood leaf miner (*Monarthropalpus buxi* is continuing its spread in the Southern Middle At States, being well established in Virginia now a west as Leesburg.

The bagworm (*Thyridopteryx ephemeraeformis* H was exceptionally abundant in Washington, D. C., ginia, and Maryland in 1929.

The birch leaf mining sawflies (*Fenusa pumila* and *Phyllotoma nemorata* Fall.) were abundant in mont and New Hampshire on paper, gray, and y birch. The infestations in the north and in are considerable elevation remain the heaviest, alth the insect occurs to some extent in Massachusett

The locust leaf miner (*Chalepus dorsalis* Thunb. conspicuous by its absence during the summer of So far as the experience of our own men goes, it di appear anywhere in numbers sufficient to at attention. It had been very abundant in the pre three or four years.

The larch case bearer (*Coleophora laricella* Hbn. reported locally abundant in parts of the sou peninsula of Michigan.

The larch sawfly (*Nematus erichsonii* Hartig) i Lake States was much less abundant in 1929 parasitism was high.

The pine scale (*Toumeyella numismaticum* Pett McD.) was exceptionally injurious locally in Minn on jack pine. In some places the trees were kille

The jack pine sawfly (*Neodiprion banksianae* wer) was reported to be much more abundant i vicinity of Itasca Park, Minn., in 1929. In the se of 1928 and 1929 it was abundant and injurio plantations near St. Paul, Minn.

Grasshoppers did considerable damage durin past summer on the Nebraska National Forest, Supervisor Nelson reported that "in one 1928 pla 72 western yellow pines were healthy, 90 injured 1,038 killed, or 86.5 per cent loss due to this i It is estimated that 50 per cent of all losses in y plantations in 1929 may be attributed to this which some old settlers say is the worst ever obse We are unable at this time to suggest control mea This condition will be given further study."

White pine weevil injury was more prevalent in over the entire northeastern area than in any year, according to the records kept by the ass entomologist stationed at the Northeastern I Experiment Station. It appears also that a gr number of trees were killed back more than two by the weevil than has previously been the case in previous years, it was found that the greatest i occurred in widely-spaced pure stands. The in in infestation in mixed stands was scarcely notic he White Mountain National Forest area, where reau of Entomology has been conducting inves- e work for several years, the bronze birch borer seemed to be more noticeable.

pine bark aphid was particularly abundant in mmer of 1929. Many trees in natural stands e older plantations were coated with the woolly nce from the ground well into the crowns.

te grubs have done great damage in many forest ies. Mortality as high as 50 per cent in trans- and seedling beds has been reported from some ies.

pales weevil continued to do considerable damage ng pine stock on or close to areas from which the had been cut the previous winter.

Fir Tussock Moth Reveals Ability to Cause Serious Damage

By R. E. Balch, United States Bureau of Entomology

1929 a good deal of concern was caused by out- s on some of the western forests of an insect to little known as a serious pest, the Douglas ssock moth (*Hemerocampa pseudotsuga*). These eaks have resulted in extensive defoliation of fir eral States, from Nevada to British Columbia.

e appearance of this moth in large numbers was ecorded at Chase, British Columbia, about 1918. at instance the insect was thought to be a variety e California tussock moth. In 1921 it was de- ed as a new species by McDonnough. There eports of damage in California some years ago may have been due to this insect; but it was not itely recognized in the United States until 1927, it was reported defoliating alpine fir at Jarbidge, , on the Humboldt National Forest. The fol- g year it was noticed in one or two places on the er and Boise National Forests, Idaho, and at Craters of the Moon National Monument. Ex- ations made in 1929 showed that the whole of Jarbidge Canyon was infested and that a serious k had occurred on some 40 square miles of the ser and Idaho National Forests. At the same time nsiderable epidemic had been developing in the hborhood of Northport, in northeastern Washing- and south of the Grand Forks, British Columbia.

e small caterpillars of this moth commence feeding he new foliage in the spring, but it is not until t the 1st of August that defoliation becomes severe gh to be noticeable at a distance. In the later es the feeding is so heavy that rangers have ribed the damage as appearing overnight. By time the larvæ are full grown. They are striking- ing hairy caterpillars easily distinguished by two , black tufts of hair behind the head, suggesting s, and a similar tuft at the posterior end. On the al side of the first four abdominal segments are se light-brown tufts, suggesting a toothbrush. The body is gray or light brown, with numerous red spots.

Pupation commences early in August and a gray cocoon, made of silk mixed with larval hairs, may be found attached to the limbs and trunks of trees and often to the underbrush. These frequently collect in large masses, particularly beneath the bases of the limbs. Sometimes the cocoons are six or seven layers deep, so that the moths are unable to emerge from the lower ones. The moths appear in the latter part of August. The female is wingless, and has a large abdomen covered with a mat of dark-gray hairs. The male is winged and is of a dark grayish-brown color. The female lays her eggs in a mass on top of her own cocoon and covers them with a frothy gelatinous secretion in which are embedded the hairs from her body.

The fact that the females are wingless makes it difficult to explain just how an infestation spreads. When disturbed or in search of food the larvæ drop to the ground and travel rapidly—at a rate of about 1 foot per minute. It may be that they are transported on the backs of sheep or cattle and, when small, by the wind. It would not be expected that an infestation would spread rapidly by these means. The insect is widely distributed, however, and favorable conditions, probably in the main climatic, cause its outbreaks to develop simultaneously in widely separated districts.

At Jarbidge, alpine fir is the tree species attacked. On the Weiser Forest the most severe defoliation is found only where lowland white fir is prominent. On the latter forest the Douglas fir is almost as closely stripped as the lowland white fir, but has not been fed upon where the latter is absent. At Roby Creek, near Boise, the attack is on pure Douglas fir. In Washington and British Columbia Douglas fir is the preferred host and lowland white fir is attacked only when mixed with it. At one point on the Weiser Forest the underbrush, chiefly Pachystima, has been fed on apparently in preference to the fir.

All these epidemics seem to be about 3 years old. There is evidence, however, that they have reached their peak. Parasitism of larvæ and eggs is high and there has been heavy mortality among the larvæ apparently due to starvation and disease. Many of the trees are already dead, and those that survive will have their leaders killed and will become decayed.

Under present conditions artificial control is out of the question. Any method that destroyed the parasites would do more harm than good. Effective control might be possible, however, if an epidemic could be recognized before it became too large. This possibility is increased by the female's winglessness. A winter clearcutting of all trees, including reproduction, over the infested area is a possible method of starving the caterpillars. Burning the stand, crown and underbrush, would be more effective. In some places conditions would permit the use of arsenicals which applied in early summer, would poison the caterpillars without damaging the trees. In the present epidemic it seems best to rely on natural control. A control measure contemplated is the introduction of a large predacious beetle, Calasoma sycophanta, which has proved valuable as an enemy of the gypsy moth.

Studies Planned to Adapt Ground-poisoning Methods to Control of White Grubs

An effort is to be made by forest entomologists in the Northeast to adapt to the control of the white grub, which is very destructive to forest nursery stock, ground-poisoning methods that have been applied with success to the Japanese beetle at the Japanese Beetle Laboratory, Moorestown, N. J. In this work H. B. Peirson, State entomologist of Maine, and H. J. MacAloney, forest entomologist of the United States Bureau of Entomology, will cooperate with the members of the Northeastern Forest Experiment Station and with State foresters in the region.

Experiments at the Moorestown laboratory have shown that control of the Japanese beetle larvæ in the soil is effective upon application of 1,500 pounds of acid lead arsenate per acre, worked into the upper 3 inches of soil. Lead arsenate costs 14½ cents per pound. This treatment is effective 3 years and perhaps longer. Tests with different arsenic compounds indicated that acid lead arsenate is the most destructive to insects and the least harmful to vegetation. In general, the more soluble compounds have least value as insecticides and are most harmful to plants. On bog soils (pH 4.6) lead arsenate quickly caused death of all plants when applied in even such limited amounts as 100 pounds per acre. In synthetic soils of equal acidity prepared for growing azaleas, etc., this deleterious effect does not occur. Present indications are that when lead arsenic treatment is given commercial fertilizers must be avoided, otherwise the arsenic is rendered harmful to the plants. Any scheme for using arsenic as an insect-control medium should, of course, include safeguards against the poisoning of human beings.

* * *

In recognition of the poisonous effect of laurel cherry (*Prunus caroliniana* Ait.) on livestock the Eicher-Woodland Lumber Co., of Woodville, Wilkinson County, Miss., requires its felling crews to pile and burn all branches or tops of this tree that are dislodged in felling other species, Junior Forester H. G. Meginnis, of the Southern Forest Experiment Station, reports. Similar disposal methods have been used by public road construction crews in Wilkinson County.

United States Wood Imports in Valued at $82,598,378

Imports of wood and wood manufactures in United States were valued at $82,598,378 in 1929, a pared with $80,139,475 in 1928 and $92,665,949 in the Department of Commerce reports. Lumber an both softwood and hardwood, imported in 1929 t 1,815,091,000 feet, and were valued at $53,29 Shingle imports decreased to 1,672,880,000 feet at $6,850,073, which is about $800,000 less tha 1928 valuation. Lath imports dropped 39 per in quantity and 44 per cent in value, to 786,76 feet valued at $3,561,514. Furniture imports valued at $5,576,472 in 1929, representing more one-half the value of wood manufactures imp Pole imports increased to 971,676, valued at $4,08 which is $770,000 more than the 1928 valu Railroad ties imported increased to total 920,995 ued at $735,758. Sawn and cleft pickets and p were not quite up to the 1928 totals, the 1929 standing at $445,757.

Softwood lumber imports totaled 1,418,319,000 The largest imports of softwood lumber from indiv countries were as follows:

	1,
Austria	
Finland	
Germany	
Poland and Danzig	
Soviet Russia in Europe	3
United Kingdom	
Yugoslavia and Albania	
Canada and Newfoundland	1, 35
Nicaragua	
Mexico	

Fire Protection on Fruit Growers Su Co. Land

The many fires that have occurred on the la the Fruit Growers Supply Co. in California in th four years have been controlled so quickly as to negligible damage, the Western Forestry and Con tion Association reports. The company has dev a modification of the European "fire lane and partment" system. At a cost of about $98,0 $4.90 an acre—much less than half the cost of and burning slash—the company has in four constructed 122 miles of 100-foot fire lanes, firep 27 miles of railroad and main highways, built 73 of special fire-protection roads, and felled all dead on 17,000 acres. Compartments average abou acres. Each edge of the cleared firebreaks is tre with a specially constructed tractor plow. An sive patrol and lookout organization is maintai

nal Lumber Manufacturers' Asso- iation Establishes Laboratory

National Lumber Manufacturers' Association
ablished a lumber laboratory of its own at the
c University of America, located in the suburbs
hington, D. C. For research in wood proper-
ndling, and utilization needed by its members in
tion with the manufacture and marketing of
the association has heretofore depended entirely
he Forest Products Laboratory of the United
Forest Service and other outside agencies. The
arried on at the new laboratory will be supple-
to that carried on through the cooperation of
outside agencies with the association. Recently
ociation's research interests have been intrusted
esearch advisory committee, of which the chair-
s C. Arthur Bruce, vice president of the E. L.
Co., Memphis, Tenn. Administration of the
ttee is in the hands of Frank P. Cartwright, chief
er of the association. J. E. Myer, a graduate of
ew York State College of Forestry who has for
l years been connected with the engineering
tment of the association as wood technologist,
ave charge of the work of the new laboratory,
Mr. Cartwright's direction.

first tests to be made in the new laboratory will
to do with fire-retardant treatments and abrasion
nce of woods.

e-Winning Devices for Preventing Waste in Lumber Manufacture

e two $100 prizes offered by the National Lumber
ufacturers Association in its 1928–29 national
-prevention contest were awarded to R. F. Buck-
edgerman and beltman employed by the J. J.
nan Lumber Co., Sumrall, Miss., and A. Bratlie,
and electrical engineer for the Snoqualmie Falls
oer Co., Snoqualmie Falls, Wash.

. Buckley's device (previously described in the
t Worker of September, 1928) is an edger safety
l that has demonstrated its value many times
its installation in the plant where he is employed.
nsists in a set of fingers of high-grade steel sus-
ed from and swinging on a shaft that is fastened
top of the edger frame. The fingers hang down
diately behind the back feed roll. They are
d about one-half inch apart by blocking so as to
nt binding. Unlike numerous similar devices
ave previously been tried this safety guard, being
ed on the back of the edger, does not interfere
the operator's view of the machine. As the tim-
r board passes through the edger and under the
feed rolls it pushes the fingers up. They ride the
r until it leaves the edger, then drop back into
on. The fingers next to the edgings keep them
ht and away from the idle saws, but if for any reason an edging topples over one or more of the fingers immediately drop down on it and hold it against the pull of the saw. The shaft from which the fingers are suspended is equipped with a coil spring which adjusts the fingers and prevents their pecking small boards that may follow cants through the edger.

This safety guard can be made up in any sawmill. To make and install it costs about $30.

Mr. Bratlie's device is a carriage block cleaning attachment having for its object the reduction of operating costs. It can be attached to any carriage operated with air, steam, or electricity. It consists in a steel spring arm that swings over and just clears the carriage block. The arm is attached to the lower end of a bell crank rotating in a bearing on the end of a piston operated by an air cylinder. The cylinder is mounted on a swinging bracket, which is bolted to the side of a carriage knee. When a log is on the carriage this arm is recessed in the face of the knee so as not to form an obstruction on the knee. When the setter wishes to clean any bark, sawdust, or other débris off the carriage block he throws a valve that permits air to enter the cylinder, thus causing the piston to be pulled in the end of the cylinder and in turn swinging the arm across the block and wiping off all débris. The device is particularly useful on carriages equipped with electrical or air dogs, since the setter can clean the blocks without leaving his position at the set works. In any event it appreciably increases the quantity of work that can be done on a carriage. It also helps to produce more accurately sawed lumber, and can be used to kick off the last board left on the carriage.

The cost of this device, installed on carriages operated with air or steam, is approximately $10 per knee. On electrical carriages the necessity of using a solenoid would increase the cost to approximately $25 per knee.

Good Returns from Sale of Walnut Trees on Missouri Farm

Seventy walnut trees on the farm of W. P. Johnson, 5 miles southeast of Minden, Barton County, Mo., were recently sold to a St. Louis firm for $1,500, the Lamar Democrat reports. The trees were second growth and were from 12 to 14 inches in diameter. The buyer was allowed to select 40 trees and Mr. Johnson himself designated the remaining 30. The buyer cut the trees and hauled them at his own expense; thus the $21.50 per tree received by Mr. Johnson was net.

According to the international log rule these trees, averaging 13 inches in diameter and containing at least two 16-foot logs apiece, had an average volume of 130 board feet, and the total volume of the 70 trees was 9,100 board feet. Thus these comparatively small-sized trees, lacking the fine figure of the large old walnuts and containing a good deal more sapwood in proportion, brought in the handsome return of nearly $165 per 1,000 board feet.

National Drainage Congress Recommends that States Encourage Reforestation

The nineteenth annual convention of the National Drainage, Conservation and Flood Control Congress, held in St. Louis February 20–22, in which 15 or more States and the Federal Government were represented, adopted the following as one of its resolutions:

> *Resolved*, That we recognize the economic waste to the country of the rapidly increasing area of deforested lands, a great proportion of which lands are unsuited to other purposes than forest growth and must remain idle unless put to service in the reproduction of much-needed commercial timber; and we express our commendation of the progressive policy of the National Government in its encouragement of reforestation in the States of the Union; and we urgently recommend to the States the great importance in the public interest of the enactment of all such legislation, constitutional and statutory, calculated to provide necessary encouragement to constructive reforestation plans wherever the reproduction of the Nation's essential timber supply may be advanced. We recognize the possibilities of forestation as a factor in water conservation and stream regulation, and commend the investigations of the Government in this direction.

* * *

The northern white pine is native to the South Carolina counties of Oconee, Pickens, Greenville, and Spartanburg, H. W. Barre, director of the South Carolina Experiment Station, reports. Its natural range extends a very short distance along the Blue Ridge in these counties, next to the North Carolina line. A few specimens seem to be thriving very well on the campus of Clemson College, 30 miles from the foothills.

Young oak trees must have plenty of sunlig they are to develop strong root systems, Prof. A Holch, of the University of Nebraska, told the Eco cal Society of America at its recent meeting in Moines. Professor Holch studied young bur oak an open hilltop, in an open stand of oaks, and in a densely grown stand of linden. Year-old seedlin the full light of the hilltop developed a root depth feet and a total spread of 2.25 feet. Trees of the age in the 12 per cent light of the oak forest had a depth of 1.6 feet and a spread of nine-tenths of a In the shade of the lindens, where there was only a 4 per cent light, the roots reached a depth of onl inches and had a 3-inch spread.

* * *

A 150-acre tract of longleaf pine forest in Ja County, Tex., was dedicated in October, 1929, a Daughters of the American Revolution Forest by Texas division of that organization. W. P. H. McF den gave 100 acres of the tract and D. A. R. chap throughout the State contributed funds for purc of the additional acreage. Further purchases planned. One of the purposes to which the are dedicated is that of demonstrating reforestation. area has been logged, but carries a good stand of s longleaf poles and reproduction, Director E. O. Sie of the Texas Forest Service, writes.

* * *

A group of north Florida business men have org ized as the Forestry Associates (Inc.), and bought 40, acres of land which is to be placed under forestry m agement by the James D. Lacey Co.

Foreign Notes

Aircraft and Radio Protect Saskatchewan Forests

Ground patrol in connection with forest-protection work in Saskatchewan has now become largely stationary, aircraft and wireless having replaced the old tedious method of canoe patrol along winding rivers and across rough, windy lakes, writes E. H. Roberts in the Forestry Chronicle. Seaplanes, supplied and manned through cooperation of the Royal Canadian Air Force, have been used most effectively to carry out detection and supervision patrols and for suppression work. The aircraft have their main base in the south-central part of the territory, with a subbase in the north-central part. Six refueling stations are located at strategic points where fire rangers have headquarters and suppression crews and supplies are available. For detection patrols in the late winter small light pla of the D. H. Moth type are used, equipped with for landing on ice. As the ice breaks up in the la this landing gear is replaced by floats.

In the spring when the waterways open up seapla are put into operation. A small flying boat that carry 400 to 600 pounds is used for detection pat and light suppression work in addition to the m planes. Larger flying boats with twin motors an carrying capacity of approximately 1,500 pounds used for heavy suppression work. These planes kept standing to at the base, fully equipped and readiness to take the air on short notice.

Facilities for rapid communication in connect with fire-protection work are provided to the Don ion Forest Service by the Royal Canadian Corps Signals. Wireless sending and receiving stations wt capacity operating on a wave length of about 0 meters have been installed at five different tin the district. The control station is located headquarters of the forest officer in charge of the ty; other stations are located at the main air base a subbases in various parts of the district.

ection aircraft equipped with wireless sending kep in touch with the bases and promptly report n observed, with details. When such a report is id by the district fire ranger he dispatches a supsn plane with men and equipment to the nearest ton a waterway from which a crew can operate. lane returns at once to its base to be in readiness fther action. All fire rangers and fire-fighting are provided with two canvas panels, 20 feet y 3 feet wide, which they use as ground signals mmunicating with the pilots of planes in the air. ngers and crew foremen are taken for flights over eas for reconnoissance. Fire maps may be ed from the air and aerial photographs taken of which are very helpful in preparing estimates of e.

he main air base and at each subbase and re- point there is maintained a warehouse fully d with fire-fighting tools and equipment. At the ngers' headquarters are kept large freight canoes, ed with outboard motors, which can be used also sporting men short distances to fires if planes are mediately available.

lane Dusting Proves Successful in anada as Method of Controlling emlock Looper

ee operations carried out last year by the Cana- Government and cooperators in efforts to control emlock looper by distributing calcium arsenate an airplane resulted very successfully, Associate nion Entomologist J. M. Swaine reports. In case more than 90 per cent of the caterpillars nt on the areas treated were destroyed.

three operations were in eastern Canada. The was carried out at Manicouagan, on the north of the Gulf of St. Lawrence, where the hemlock r had been spreading rapidly in balsam fir stands vo years. This outbreak extended over an area ne 3 square miles adjoining the estuary of the couagan River and had behind it a very extensive of valuable pulpwood. Timber operators holding in the infested region cooperated with the pro- l and Dominion governments in the work. n tons of calcium arsenate was shipped to Mani- an and the area to be dusted was surveyed and ed for the guidance of the pilot. Dusting was on July 7 and was continued in all favorable er during the second and fourth weeks of the n. The poison was applied in doses varying from 10 to 20 pounds per acre. Results indicated that for the younger stages of the caterpillar 10 pounds per acre would be an effective dose, and that for the older stages the maximum dose required would be 20 pounds per acre. Here, it is reported, certain natural factors were undoubtedly operating to reduce the number of the caterpillars, but the effect of the dusting was immediate and most convincing.

During the same period a dusting operation on a similar scale was conducted with similar results by the forest branch of Ontario and the Dominion division of forest insects for the control of a hemlock looper outbreak on hemlock over a large area about Lake Joseph, in the Muskoka region. A third such operation was carried out by forestry organizations in British Columbia in cooperation with the Dominion division of forest insects on a less widespread infestation of the hemlock looper affecting western hemlock.

For forest dusting operations under commercial conditions at a short distance from water or rail transportation, east of the Great Lakes, Doctor Swaine estimates the cost of the dust, landed at the base of operations, at approximately $1.25 per acre; the cost of labor, food, and incidentals, at $1 per acre; and the plane charge at about $3.55 per acre, with variation according to location and conditions of the area. The total estimated cost of approximately $6 per acre, or $38.40 per square mile, he remarks, will be a profitable investment if the operation results in checking a small outbreak and prevents its extension over a large and valuable forest. Otherwise, the justifiability of the expenditure will depend on the value of the stand to be treated.

Insects like the spruce budworms, which feed much of the time within nestlike shelters in the foliage, are not so readily destroyed by poison dusting as insects such as the hemlock looper and the jack-pine sawfly, which feed in an exposed position on the foliage. A continuation in 1929 of dusting operations directed against a spruce budworm outbreak at Westree, west of Sudbury, Ontario, resulted in destruction of large numbers of the budworm caterpillars on areas receiving from 30 to 40 pounds of poison; but the mortality was not high enough to be considered a commercial control. The timber on the area treated had been injured by previous defoliation much more severely than had been detected in advance of the dusting operation, so that the caterpillars very quickly destroyed the little foliage on the exposed tips of the crowns and dropped to the lower branches, where they were largely protected by the surrounding hardwood foliage. It was believed that satisfactory mortality would probably have been obtained if engine and hopper trouble had not delayed the application for several days.

In these operations use was made of a trimotor plane, mounted on floats, capable of carrying nearly a ton of dust.

A Successful Norwegian Forest Insurance Project

The successful operations of the Norwegian Mutual Insurance Company for Forest Fires have enabled the company to create through transfer of surplus a special fund which will provide extended insurance upon property that has been insured 25 years, Trade Commissioner Gudrun Carlson, Oslo, reports to the Department of Commerce. The 11,200 members of the company now carry insurance amounting to 377,824,596 crowns (Norwegian crown=$0.268). The company now contemplates developing a system of single premium insurance, the demand for which is increasing in Norway. The inauguration of these plans has been made possible by cooperatively developed fire-prevention measures, particularly the maintenance of lookout towers throughout the forested area. The insurance company itself has made substantial contributions toward the construction of towers.

Caterpillars and Microsphaera Collaborate Against the Oaks

A theory of collaboration between caterpillar and microsphæra in explanation of the dying of numerous oaks in the forests of Yugoslavia is offered by Auguste Langhoffer, of the University of Zagreb, in the November, 1929, Revue des Eaux et Forêts. The caterpillars mentioned are Lymantria dispar L., Euproctis chrysorrhœa L., Malacosoma neustria L., and Thaumetopœa processionea L. The microsphæra are Microsphæra alphitoides Griff and Maubl. Great losses of oaks were recorded in the periods 1909–1912, 1915–1918, and 1920–1928. The oaks died only where the caterpillar attacks took place and always it was the oak attacked by caterpillars that died. Before 1909 the oaks were attacked by caterpillars which stripped them of leaves, but the trees did not die. New leaves came out and no evil effects were evident. But when the microsphæra came on the scene the oaks died en masse. The caterpillars got the first leaves of the season, the microsphæra got the second crop that came out about the beginning of June. The summer heat helped the destruction, for the second leaves are small and have little resisting power. They dry up and fall one by one. Following this the oak, unable to put out a third crop of leaves, usually dies. Some trees are especially hardy and resist until the second year.

The microsphæra may attack the first leaves, but without killing the tree. Early in the season the temperature is not favorable to the microsphæra and the tree is able to withstand the attack. When humidity is not considerable, also, the microsphæra does not develop and attack the second leaves in a dangerous way. In 1927 the very hot and dry summer held back the development of the microsphæra until the leaves were advanced enough to resist attack.

Many an oak that would have survived the coll ration of these two enemies falls a victim to a t enemy that finds it enfeebled by their attacks. Sp of Agrilus biguttatus Fabr., Platypus cylindrus F Xyleborus monographus Fabr., Gasterocercus depr rostris Fabr., and others, including mushrooms Armillaria mellea, are named in this list.

Remedies suggested are birds that eat the ca pillars, parasites, destruction of egg masses, and ar powder distributed by airplane.

New Quarters for the Forest Resea Institute of India

The new plant of the Forest Research Institut India was opened at Dehra Dun, India, on Noven 7. The main building and nearly all the subsid buildings and residences had been completed by date, trees and shrubs had been planted, and gr lawns and terraces had been developed. The p includes six museums having a floor space of 26, square feet, and laboratories and offices covering ab 63,000 square feet. There is a library finished Andamans padauk, a large hall in Burma teak, and entrance hall in shisham and rosewood. The offic the forest economist is panelled in poon (Calophyll from Madras. Burma teak has been used through the other rooms. A special feature has been mad the windows, with good lighting for laboratory w the Indian Forester reports. The students of Indian Forest Service College, who must now le Chand Bagh, will be given lecture rooms in the up floor of the west wing. The whole estate covers 1, acres, but 130 acres of this has been assigned to railway board for a training college, and 6 acres been leased to a company that will provide electric rent to the new buildings. A considerable part of grounds is taken up by experimental plantations of pine, sal, and teak, and by the experimental gard of the silviculturist, the botanist, and the office charge of minor products.

Dehra Dun has been a center for forest work si 1878, when a college was established there for trai rangers and foresters. Research officers were appointed in 1906, since which time these officers h taken an important part in training the stude The aim of the research has always been to w on lines that will prove advantageous not only to forest departments of all the provinces of India also to all users of forest products, especially railways and other large consumers of timber. pansion of work and increase of staff have been ste during the last 23 years. In the branch of fo economy, which deals with the utilization of fo products, growth has been remarkable. The insti now employs 35 gazetted officers, 220 assistants subordinates, and 350 day laborers, and its an expenditure is more than 7 lakhs of rupees.

work of the institute is divided under five —silviculture, forest economy or utilization, entomology, forest botany, and chemistry.

e 1906 the institute has issued about 220 publis presenting the results of its work, as well as a number of educational and other works.

building erected for the institute in 1914 at l Bagh is now to be given up to medical research.

◆

ween 3,000 and 4,000 acres of forest plantations established by the Irish Free State Government year ending September 30, 1929, according to a nent in the Timber Trades Journal, London. lanting took place principally in Wicklow, Waterand Tipperary. About 10,000,000 trees suitable anting are produced by the Government nureach year. About 80 per cent of this stock is of ood species; the remainder is beech, ash, and elm.

◆

Riding Mountain Forest Reserve, in western toba, has been made a national park. The established park includes 1,148 square miles of woodland. Park headquarters will be at Clear

The British Empire Marketing Board has approved a capital grant not exceeding £30,000 to be devoted to research on Empire timbers at the Forest Products Research Laboratory, Princes Risborough, Bucks, England. This grant, the Empire Forestry Journal reports, arises out of a recommendation made by the Imperial Economic Committee in its report on Timber. The committee suggested that the marketing of Empire timbers might be considerably furthered if the Princes Risborough station could be enlarged so as to include the testing of woods from the dominions and colonies as part of its normal routine.

◆

The 1,878 meetings held in 1929 by traveling lecturers of the Canadian Forestry Association had an attendance of 475,742. The lecturers' mileage was 70,014. For 1929 the association reports a membership of 32,008.

◆

During 1929 extreme drought conditions prevailed throughout western Canada. The area burned over was 6,029,749 acres, of which approximately two-thirds was nonforested. Suppression costs reached the unprecedented total of $978,000.

Personals

lliard R. B. Hine has accepted appointment as tive secretary of the Society of American Foreseffective April 1. His headquarters will be in ington, D. C. Mr. Hine received the B. S. e in 1920 and the M. F. degree in 1921, both from ll University, and was appointed in the latter to a position at the Southern Forest Experiment n. Leaving the station in 1925, he became State er of Louisiana. He left this position in October, to accept appointment with the United States t Service as senior district forest inspector in e of Federal cooperation under the Clarkeary law in the Gulf States.

H. York, for several years supervisor of forest igations, division of lands and forests, New York rvation Department, has resigned to accept the of forest pathology, University of Pennsylvania.

n D. Rue, recently director of research of the pion Fibre Co., Canton, N. C., is now connected the Newsprint Service Bureau.

yd V. Horton, inspector in the office of range gement in the Portland, Oreg., district office of the d States Forest Service has been promoted to the on of assistant district forester in charge of lands.

Samuel J. Record, head of the tropical department in the Yale School of Forestry, has been chosen a member of the standing committee on forest resources appointed at the Fourth Pacific Science Congress, held in Java in 1929. The function of the committee is to collect information as to the forest resources of the countries around and in the Pacific.

Ward Shepard has resigned as assistant chief of the branch of public relations, United States Forest Service, in charge of information, to become associated with Gifford Pinchot in work having to do with forest conservation. Mr. Shepard entered the Forest Service in 1913 immediately after graduation from the Harvard Forest School. After holding several positions in the Southwestern National Forest District he was brought to Washington in 1921 as assistant chief of the branch of research. He transferred to the branch of public relations in 1926.

Henry B. Steer will soon join the United States Forest Service as senior forest economist in charge of stumpage-price and lumber-price projects. Mr. Steer is a graduate of Cornell University with the B. S. and M. F. degrees, and has had 11 years' experience with the Indian Service. At present he is in charge of all timber work on the Quinault Reservation.

Carlyn C. Delavan, professor of forestry at the New York State Ranger School since 1923, has been transferred to the extension department of the New York State College of Forestry. He succeeds G. H. Lentz in extension work and also as director of the summer camp of the college. Professor Delavan is a forestry graduate of the University of Michigan, and before entering the educational field had experience in the United States Forest Service and in the State forestry organization of Vermont.

A. C. Shaw, supervisor of the Choctawhatchee and Ocala National Forests, Fla., on May 1 succeeds the late R. H. Charlton as supervisor of the Ouachita National Forest, Ark. S. R. Broadbent, supervisor of the Unaka National Forest, Tenn., succeeds Mr. Shaw, and C. I. Graham, assistant supervisor of the Pisgah National Forest, N. C., succeeds Mr. Broadbent. Junior Forester John Byrne transfers from the Nantahala National Forest, N. C., to the Pisgah Forest as assistant supervisor, and District Ranger John H. Stone of the Allegheny National Forest, Pa., succeeds Mr. Byrne.

Charles E. Randall has been promoted to the position of senior editor, branch of public relations, United States Forest Service. Mr. Randall, who is a graduate of Leland Stanford University, entered the Forest Service early in 1927 after several years' experience in blister-rust control work and in newspaper work. His work in the Service heretofore has been the preparation of press material and arrangement of forestry programs for radio use.

Jack B. Haile, superintendent of road construction in the Eastern National Forest District, has been transferred to the Washington office of the United States Forest Service as associate engineer.

R. W. Shields, for two years supervisor of the Shenandoah National Forest, Va., has been transferred to Washington, D. C., as assistant to the chief of operation, Eastern National Forest District. Since 1911 Mr. Shields has had a part in national forest acquisition and development in the East. He is succeeded by John W. McNair, assistant supervisor of the Cherokee National Forest, Tenn. Mr. McNair entered the Forest Service in 1919 as a ranger on the Natural Bridge National Forest, and for nearly five years was assistant supervisor of the Pisgah National Forest. Ernest J. Schlatter, junior forester on the Deschutes National Forest, Oreg., is being transferred to the Cherokee Forest as assistant supervisor.

C. E. Farnsworth, jr., a 1928 graduate of the Yale Forest School employed until recently as technical assistant on the Targhee National Forest, Idaho, has accepted the position of instructor in forestry at the New York State Ranger School, Wanakena, N. Y., effective March 15, 1930.

J. A. Evans, assistant chief of the Office of operative Extension Work, United States Depart of Agriculture, has been made associate chief of office. He is succeeded by T. Weed Harvey, form assistant to the chief.

Ralph W. Hussey, associate range inspector in Southwestern National Forest District, has been pointed supervisor of the Apache National Fo Ariz.

A. J. Streinz, timber sales assistant on the Oua National Forest, Ark., has resigned to accept a tion as assistant professor of forestry at the Unive of Louisiana.

W. H. Monsson, chemist on the pulp and paper at the United States Forest Products Laboratory the laboratory March 20 to accept a position with Munising Paper Co., Munising, Mich. Mr. Mon who is a graduate of the University of Illinois, acce appointment to the laboratory staff in 1923. received the M. S. degree from the University of consin in 1925. His experience at the laboratory been mainly in sulphite pulping research.

Clarence Hill Burrage has resigned as foreste the University of Kentucky and is now connected the Virginia Conservation and Development mission. His new work has to do with the purc of land for the proposed Shenandoah National

J. Oscar Blew, jr., has joined the faculty of the York State College of Forestry, succeeding Georg Kramer as instructor in timber preservation. Blew was graduated at this college in 1927, and then has had experience in industrial timber pr vation.

Ellwood Wilson, manager of the forestry div of the Canada Power & Paper Co., Grand' Quebec, has been elected president of the Cana Forestry Association.

P. Z. Caverhill, of the British Columbia F Branch, is president of the Canadian Society of F Engineers for 1930.

Carl L. Hubbs, curator of fishes of the Universi Michigan Museum, has been named to direct scientific investigations of the fish division of Michigan Department of Conservation.

James D. Kennedy has resigned as assistant pr sor of forest extension, New York State Colle Forestry, to accept a position as district foreste the New York Conservation Commission, with quarters at Auburn, N. Y. Mr. Kennedy is a me of the 1923 forestry class of Purdue University. was previously connected with the blister-rust co work of the New York Conservation Commission

rry E. Dobbins has resigned as junior forester,
d States Forest Service, to accept a position as
ct forester of the New York Conservation Com-
ɒn, with headquarters at Salamanca, N. Y.
Dobbins had forestry training at the University
sconsin and the University of Michigan.

Leon J. Cranston, for the past five years in charge of the San Jacinto district of the San Bernardino National Forest, Calif., has been promoted to the position of assistant forest supervisor. He will have charge of the improvement program on the San Bernardino.

Bibliography

ulletin on Forest Nursery and Planting Experiments in California

By C. R. TILLOTSON, United States Forest Service

orest Nursery and Planting Practice in the Cali-
ı Pine Region" does not exactly indicate the scope
e bulletin[1] by S. B. Show recently published by
Jnited States Forest Service under that title.
bulletin does not take up the mechanics of nursery
or the methods and practices of large-scale
ing operations. It does present a rather clear
re of the difficulties attending forest planting in
ornia, such as the brush cover, the scantiness and
distribution of rainfall, the lack of moisture in
oil during summer, and the high rate of evapora-
The bulk of the discussion, however, is devoted
perimental results achieved in two nurseries with
rn yellow pine, sugar pine, Jeffrey pine, incense
, Douglas fir, and white fir. The experiments
directed toward developing a technique, both in
ry operations and in field planting, that would in-
reasonable success in efforts to reforest California
fields. They gave a partial indication also of
egree of success possible in reforesting these lands.
bulletin will have immediate interest for persons
ganizations contemplating forest planting in the
ornia pine region.

mitting that his data are in some cases insuffi-
for definite conclusions, where his results seem to
y it the author does draw such conclusions in re-
to various features of nursery practice and field
ing. For instance, he states definitely that better
s of western yellow pine and Jeffrey pine are pro-
l from spring-sown than from fall-sown seed,
sugar pine, white fir, and incense cedar develop
actorily only from fall-sown seed; that drill sow-
nd broadcast sowing seem to give essentially the
results; that burlap mulch is in general superior
mulch of pine needles; that western yellow pine,
y pine, and incense cedar are produced as well
no shade as under shade, and the pines especially
op a great deal better when shade is not applied. Sugar pine, Douglas fir, and white fir, on the other hand, experience heavy losses if unshaded and do better even in the transplant beds if shade is supplied. Abundant watering, particularly in seed beds, is proved to be essential, particularly for the growing of thrifty, properly developed stock. In respect to field planting, the author concludes that for most planting areas seedling stock gives too uncertain results; 1–1 stock is best for ordinary use, and 1–1–1 stock for very unfavorable sites. In brush-field planting, survival percentages are shown to increase with increase in the degree of shade the plants receive, and better results are obtained by planting in the early spring as soon as the snow leaves the ground than by fall planting.

The publication is not only an excellent guide for the nurseryman or planter in California; it is a clear demonstration of the practical value of the information that well planned and executed experiments can bring out. It contains many helpful suggestions for nurserymen and planters of other regions as to how they may grapple with their own nursery and planting problems and improve their own technique.

A Study of 30-Year-Old Forest Plantations

Under the title "Forest Plantations at Biltmore, N. C.," the Forest Service has recently published the results of a general study made in 1921–22 of plantations established on the Biltmore estate, near Asheville, N. C., from 1890 to about 1911. The study was made by the Appalachian Forest Experiment Station. Interest attaches to this study not only because of the age and extent of the plantations but because of the large number of species used. In summarizing his conclusions from the study Ferdinand W. Haasis, author of the report, attributes the unsatisfactory results obtained from many hardwood plantings on the estate to the fact that between the time when the land sustained a stand of native hardwoods and the time when plantings were made soil conditions had changed as a result of the farming of the land and its subsequent abandonment. A second obstacle to satisfactory results with hardwoods has been the action of rodents, both in eating seed and in attacking seedlings. The suitability of northern white pine for planting in the region has been clearly demonstrated, as has the desirability of planting the native yellow pines in mixed stands. Of the hardwoods that have survived sugar maple is the best and oaks are second. Oak as an understory of pine can evidently be counted upon to persist and to step readily into the place of the pines when these are removed. Of the exotic species tried at Biltmore, Norway spruce has given the best results. The plantations afford convincing evidence of the silvicultural value of thinnings where trees have been closely spaced.

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[1] ted States Department of Agriculture Circular No. 92. For sale
Superintendent of Documents, Washington, D. C., at 15 cents

Copies of this publication can be obtained free of charge, while the supply lasts, from the Office of Information, United States Department of Agriculture, Washington, D. C.

Tractor Logging Costs in the California Pine Region

By J. A. FITZWATER, United States Forest Service

In Bulletin 474 [2] of the Agricultural Experiment Station, University of California, Associate Professor of Forestry M. E. Krueger has analyzed data on factors affecting the cost of tractor logging in the California pine region which he obtained by observations on five different logging operations. Mr. Krueger's studies show clearly the degree to which the cost of yarding in caterpillar tractor logging is affected by the factors of stand per acre, number of logs per thousand board feet, length of haul, slope, and soil. The operations studied were uniform as to the specific types of equipment used; where equipment not of the same specific types but of the same general type and power is used, Mr. Krueger points out, costs should not differ materially from those indicated by his analysis.

Mr. Krueger emphasizes the fact that no other development of recent years has been so readily applicable to selective logging as has tractor yarding. His studies (two of which were conducted on national forest operations) convinced him that good forestry practice in tractor logging can be obtained by observing the two simple regulations of holding tractor travel to well-defined skidding trails and turn-out places and avoidance of choking two logs at ends adjacent to the same cut; also that if operators are determined to carry on good forestry practice in the woods they can, through good organization, largely eliminate the damage attending tractor logging, with but little additional cost.

Mr. Krueger summarizes the results of his studies as follows:

> Other factors being equal, small-diameter logs cost considerably more to yard by ground skidding than do large-diameter logs, owing to the difficulty of maintaining a high average load per trip. This can be somewhat offset by logging in long dimensions o hauling a larger number of logs per trip.
>
> It is economy to leave small-diameter trees stand
>
> Size of load is the biggest factor affecting the of yarding because the increase in the total trip is nowhere proportionate to the increase in the siz the load. The size of the load is basic to the fac of log size, slope, and surface conditions.
>
> Slope produces a greater effect on the cost of gro skidding than on wheel yarding. Increase of adv slopes materially decreases the load per trip and th fore increases the cost per thousand board feet both methods of yarding. Favorable slopes of 10 cent to 30 per cent are ideal for skidding, with practical maximum at 50 per cent.
>
> The larger possibility of excessive yarding cost co from yarding short of the economic maximum dista rather than beyond it.
>
> Bunching cost is a very large factor of yarding in the use of Robinson big wheels. The cost of bun ing is practically in direct proportion to the numbe pieces handled per bunch.
>
> The main requisite for successful tractor loggin proper organization. The very important item maintaining a high average load per trip is largel matter of proper supervision, and proper balance equipment is the result of careful planning.

This bulletin should prove very helpful to opera who are using or who contemplate using caterpi tractors for yarding purposes. In many cases tables themselves will be directly applicable; the value of the study, however, lies in the fact tha provides operators in general with a basis for analyz their own particular problems.

Our Federal Lands

By L. F. KNEIPP, United States Forest Service

In a volume entitled "Our Federal Lands," [3] the s title of which is "A Romance of American Devel ment," Robert Sterling Yard has brought out q successfully, in a popular and entertaining way, historical and romantic highlights of the Fed Government's land policy. The reader may note occasional statement or figure that does not squ with his own knowledge or understanding, or a con sion with which he can not agree; this possibility withstanding, one can gain from the book a fr and broad idea of the trend and sweep of the public l movement and the several epochal stages by whic has advanced.

Beginning with a background of general discuss of our national estate, its origin and extent, Mr. Y passes to the consideration of the public dom national forests, reclamation, water power, Indi national parks, national monuments, and wild resources, concluding with a summary of prog resulting from a half century of nature conservat In the process he expresses the point of view and reactions of the average citizen who is interestec such subjects.

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[2] Krueger, M. E.: Factors Affecting the Cost of Tractor Logging in the California Pine Region. 44 pp. illus. University of California Printing Office, Berkeley, 1929.

[3] Charles Scribner's Sons, New York, 1928.

earch Casts Doubt on Fertilizing Value of Nile Silt

By C. L. Forsling, United States Forest Service

old belief that the silt brought down by summer
of the Nile maintains the fertility of the soil in
ch agricultural valley of that river has undoubt-
ed many people in this country to consider that
lt burden of any stream is good for something.
irrigationists have even gone so far as to say that
lt added by irrigation water helps maintain the
rtility of farmed land. A noteworthy example of
pposite effect is, of course, the Imperial Valley in
rnia, where the farmers have learned through
experience that the silt of the Colorado River not
s not to be desired, but must be disposed of so far
ssible before it reaches the land.

t now comes E. M. McKenzie Taylor, of the school
riculture, University of Cambridge, England, cast-
doubt upon that long-entertained supposition
ding the silt of the Nile. Writing in the June 20,
issue of the Engineering News-Record, he states
the Nile silt has not the fertilizing value previously
buted to it. In irrigated as in nonirrigated areas,
ys, the maintenance of soil fertility depends upon
ultural practices.

is conclusion is based on experiments involving
leposition of silt in growing cotton over a 3-year
d. The results indicated that summer fallow is
ffective agent in the maintenance of soil fertility
r perennial irrigation in the Nile Valley. The
of silt as a fertilizer should not, of course, be
used with its value as a soil former.

ere remains the argument in favor of silty streams
rrigation, upheld particularly by irrigation farmers
e districts of limited water supply in Utah, that
aden water can be made to cover more land than
water. This is of no small importance in places
re the water supply is very scanty and where the
r that percolates through the soil can not be re-
red by drainage or pumping—provided, of course,
deposition of silt does not result in too great a sealing
f the soil or in the addition of enough raw soil to
r the fertility of the land. In at least one district in
h water users are complaining that the checking of
ion through revegetation of national forest water-
ds has cut down the silt in the streams and thus
ced the acreage the water will cover. Run-off ex-
ments recently carried out by the California Forest
eriment Station have demonstrated that the greater
rage by silty water is due to the sealing up by the
of the pore spaces between soil particles.

he old theory in regard to the value of the Nile
er silt, Doctor Taylor remarks, does not appear to
e been questioned previously. Apparently it had
n accepted as true simply on the basis that it had
n repeated "from the time of the Pharaohs." All
dern irrigation works in Egypt until recently were
gned to carry the silt to the land, even though great expense was involved in keeping the canals clear enough for the water to get through. If the findings in respect to the lack of fertilizing value of the silt are verified by further tests, less expensive irrigation systems in which the water is desilted before entering the canals may be employed.

A Russian Authority Reports on Work in Tree Breeding

By Perkins Coville, United States Forest Service

In a Russian reprint with English summary recently received from the author A. Kolesnikov, professor of forest tree breeding at the agricultural college at Charkow, Ukraine, Union of Socialist Soviet Republics, discusses the subject "The Inbreeding of Forest Trees and its Meaning in Forest Genetics and Selection."

A great drawback of tree breeding as distinct from selection or vegetative propagation is the length of time that ordinarily must pass after the first pollination before the F_1 generation (the offspring of the first cross) bears flowers that furnish the basis for breeding the F_2 generation. Kolesnikov suggests as a means of forcing early maturity of the reproductive organs of young F_1 seedlings that F_1 seedlings be grafted into the crowns of older trees. In order to have good pollen of Quercus robur from various localities conveniently at hand for a study of its properties, for collection, and for use, Kolesnikov tried out successfully a procedure that is practically a reversal of that suggested for hastening maturity of the F_1 generation: "we grafted branches with blossom buds in their winter state to oak seedlings and to the seedlings of other leaf trees at the age of 1–2 years. In this way we succeeded in producing at the desired date tall flowering trees giving an abundant quantity of pollen of great vital capacity."

Kolesnikov also reports successful vegetative reproduction (by means of green cuttings) of Quercus robur, Fraxinus excelsior, Juglans regia, J. cinerea, J. nigra, and other species.

It is Kolesnikov's theory that no less success should attend the inbreeding (pure lines) and selection of forest trees than has attended the inbreeding and selection of agricultural plants. He has tested this by inbreeding Quercus robur, Betula verrucosa, Ulmus campestris, Ulmus effusa, and Pinus sylvestris, and reports that no degeneration, as judged by "germinative power" of the seed and vigor of the seedlings at one year of age was apparent except in the case of Pinus sylvestris, which had "an insignificant quantity of fertilized seed."

Referring to basic studies needed for a better understanding of tree breeding, Kolesnikov writes: "Then a detailed study of the structure of the flower organs, of the fertilization processes, and of the development of the ovary and seeds would be of great importance. The study of the pollen, its storage, transporting, and tests of germinative power before using should follow, being of essential interest for hybridization purposes."

Races of Oak and Their Breeding

By W. N. Sparhawk, United States Forest Service

In common with many other species of trees the European oak (*Quercus robur*) has distinct physiological forms characterized by early and by late leafing and flowering. These characteristics are hereditary, but may be obscured by crossing. According to A. Kolesnikov,[4] these physiological forms do not appear to be correlated with the common morphological differences in leaves, fruit, and buds, but do correspond more or less with differences in technical properties of wood, bark, etc. The late variety has wood of superior quality and resists frosts, insects, and fungi better than the early variety. The late variety also has a straighter bole, with fewer large branches, and grows faster in the juvenile stages. Planting stock of this variety can be obtained by gathering acorns from fairly isolated stands from which all individuals of the early form have been removed, and by carefully culling out from the nursery beds any seedlings of the early form.

The author remarks that foresters have not paid sufficient attention to the differences in races of oak and other trees, owing to their ignorance of the principles of plant selection and breeding. He makes the suggestion, which may be of interest to American forest schools, that a course in the fundamentals of forest genetics and selection should be introduced into the curricula of all the higher forest schools.

Denudation of the Punjab Hills

By F. H. Eyre, United States Forest Service

The forests of the Punjab (northwestern India) have undergone and are still undergoing serious deterioration in quality and extent. Moreover, erosion has progressed to a point at which the future productivity of the land is greatly endangered in many places and in others is actually destroyed. In many respects the situation is analogous to that found in parts of the United States. Consequently a description such as is given in a recent volume [5] of Indian Forest Records by B. O. Coventry, conservator of forests, Punjab, should be of especial interest to American foresters.

The author treats his descriptive material from an ecological point of view. In the drainage basin of the Indus where the Punjab is situated, topography and climate vary enormously. From only a few hundred feet on the southern plains, elevations increase to more than 20,000 feet in the Himalayas. Average annual rainfall ranges from 5 to 30 inches on the plains and from about 50 to 100 inches on the higher hills. The forests may be divided into several altitudi climatic zones. "In the subtropical zone the clim formations of olive [*Olea cuspidata*] forests and oth mesophytic types are changing to brushwood forests sanatha." Widespread erosion has removed the t soil so that the valuable species which need this hum soil for regeneration have largely disappeared.

"In the subtemperate zone the mesophytic a climax formations of oak [*Quercus incana*] are changi to chir pine [*Pinus longifolia*], and the chir pine fore are generally deteriorating in quality." Chir pi forests are usually burned periodically to rid the s of pine needle litter and thus make room for gra Erosion has followed. Chir pine, being thick barke has been able to stand the fires, and it continues regenerate itself on mineral soil exposed by fir But each fire is followed by considerable erosion the surface soil, and as a result the chir pine fore have deteriorated considerably in quality. In plac all the soil is gone and the chir pine remains to gr only in rock crevices.

"In the temperate zone climax formations of o or other broad-leaved species are changing to blue pi [*Pinus excelsa*]. In other words there is a gener tendency for the climax and mesophytic types change to more xerophytic types, indicating a gener change from moist to drier soil conditions * * *.

"The deterioration and retrogressive changes in t vegetation * * * are generally traceable to cha in the soil due to erosion * * *.

"For the purpose of clearing lands for cultivatio providing grazing grounds with ample supplies fodder, and protecting cattle against wild anima wholesale destruction of the vegetation by means fire has taken place in the past. In fact man has d stroyed the forest vegetation wherever it has be possible to do so by means of fire, and the fores which are still in existence on the hills at the prese day are simply the residue which man has not be able to destroy by fire owing to the dampness of t locality, or to the forests being of a noninflamma type, or consisting of species immune against extern nation by fires * * *.

"From time immemorial it has been the custom the people on the hills to feed their cattle by sendi them out to graze at random over the hillsides witho any restraint or attempt to regulate the grazi whatsoever." The recognition of grazing "rights" long standing has resulted in overgrazing and erosio

Need for forest conservation was recognized in t Punjab as early as 1855. About 1870 the Gover ment forest department was organized. Rules dra up soon after the passing of the Indian forest a defined what areas were to be taken up as Governme forests and defined the "rights" that were to be a mitted in the forests. On forest lands aside from t aratively small proportion included in reserved s unrestricted grazing was permitted, although ctions were made over certain areas with regard e cutting of trees. Liberal recognition was given azing "rights."

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[4] The Races of Oak and their Breeding, in Russian with German summary. Charkiw, 1928.

[5] Denudation of the Punjab Hills. 31 pp. illus. Indian Forest Record, vol. 14, pt. 2. Calcutta, 1929.

e remedial measures suggested by Coventry are me respects alien to the American point of view. ized pasture management is regarded as the only on. It is proposed that certain areas be denuded ees and handled as pastures pure and simple. s would hold the soil and with the removal of the eting forest cover the incentive to burn would be y eliminated. Other areas would probably need handled for the production of grass crops which d be cut after seed had fallen. The expectation pressed that the rural people will not take any tive in protecting their common lands against dation and that it may be generally necessary in rst instance for the Government to undertake the ol of these lands. In the case of some villages, suggested, the difficulty could be most satisfac- y overcome by dividing the common pasture lands private properties, each household being given a ient area for growing grass crops for the main- nce of its cattle.

welve-Year Results with Wyoming Shelter-Belt Planting

sults from shelter-belt plantings made at the idan Field Station, Sheridan, Wyo., in the period –1928 are reported by the University of Wyoming cultural Experiment Station in its bulletin no. 163.[6] station is located on a nonirrigated tract about 8 s northeast of Sheridan. Most of the land used helter-belt plantings is on a northeast slope, the consisting in a dark, heavy clay loam with a small tity of gumbo. The rainfall as recorded at the on shows wide fluctuations both in quantity and stribution during the season, a condition charac- tic of the Great Plains. The average annual all for the 10-year period 1917–1926 was 15.10 es, with a range from 8.56 inches in 1919 to 3 inches in 1923. Temperatures as high as 100° F. mmer and as low as − 30° F. in winter occur, but m during any season and in many years not at all. ods of warm weather, with day temperatures e freezing, are frequent during the winter. The velocity is relatively low compared with that in r sections of the Great Plains. Strong drying s sometimes occur, but are relatively infrequent.

ne plantings were made in cooperation with the hern Great Plains Field Station of the United States Department of Agriculture, at Mandan, N. Dak. Seedling trees were supplied by that station and the plantings were made according to plans furnished by it. The plantings were made on land that was in summer fallow the year before planting and in some cases for a longer period. Clean cultivation has been practiced since the shelter belts were planted.

A strip of ground 80 feet wide and 1,000 feet long on the west side of the station grounds and immediately west of the buildings was planted in 1917 in two equal blocks. In block 1 the trees were planted 4 feet apart each way. Nineteen rows, succeeding each other from west to east, were planted with the following species; Golden willow, golden willow, boxelder, green ash, poplar, boxelder, American elm, boxelder, green ash, poplar, boxelder, poplar cuttings, Chinese elm, green ash, poplar cuttings, green ash, boxelder, green ash, golden willow. In block 2 the trees were 4 feet apart in the rows and the rows were 8 feet apart. Here the arrangement of species was as follows: Golden willow, boxelder, poplar, American elm, green ash, boxelder, Chinese elm, poplar cuttings, boxelder, golden willow. Trees that were killed back or that made poor growth were later replaced with trees of the same or different species.

Green ash and American elm survived the best of any of the trees planted in 1917. More than 85 per cent of both species lived and neither was killed back noticeably in any year. Green ash grew very slowly in the 1917 planting, but grew much faster in the later plantings in which more space was allowed between the trees. American elm made about the same growth as boxelder where the latter was not killed back.

Boxelder survived nearly as well as green ash on low ground and on the east side, but except on low ground it was killed back badly on the west side.

Chinese elm made the fastest growth of any of the trees planted in 1917. As large a proportion of the Chinese elm as of the ash and American elm lived; but the Chinese elm was killed back badly in 1927 and 1928, some of the best trees being killed out completely in those years.

Only 35 per cent of the golden willows on the east side of the shelter belt lived. These made good growth after 1920. None of the golden willows on the west side lived except in a shallow ravine that crosses the blocks near the center, and those in the ravine made only a scrubby growth.

In the later plantings northwest poplar made a faster growth than Chinese elm and nearly all that were planted lived. Russian olive and buffaloberry made good growth with no noticeable killing back.

Caraganas planted in a row by themselves in 1922 and in the shelter belt in 1927 made fast growth. At least 95 per cent of these lived, and none were killed back.

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FOREST WORKER

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Announcements

General Federation of Women's Clubs

The Twentieth Biennial Convention of the General Federation of Women's Clubs will be held at Denver, Colo., June 5–14. A special conservation meeting will be held on the afternoon of June 9. Mrs. Katherine B. Tippetts, chairman of the division of conservation of natural resources, will preside and will speak on A Concerted Effort for Conservation. Mrs. F. E. Whitley, vice chairman, will speak on America, the Beautiful—At the Cross Roads. Mrs. Frank Warren, chairman of the water and waterways committee, will give a brief review of recent waterway developments. Following the program a memorial tree will be planted in honor of Stephen D. Mather, former Chief of the National Park Service, the tribute being given by Mrs. John D. Sherman, and the benediction pronounced by Mrs. John F. Sippel, president of the General Federation.

The American Society of Agricultural Engineers

The annual meeting of the American Society of Agricultural Engineers will be held at Moline, Ill., June 16–18. An invitation to join the International Congress of Agricultural Engineering to be held at Liege, Belgium, in August of this year, has recen been received and accepted by the American Soci of Agricultural Engineers.

The Pacific coast section of the American Society Agricultural Engineers was held at Oregon State C lege, Corvallis, on May 2 and 3. Machinery, lum ing, electrification, tillage, and reclamation subjects of the various speakers on the program.

National Conference on State Parks

The tenth annual meeting of the National Con ence on State Parks will be held at Linville, N. June 17–20. The Governor of North Carolina and North Carolina Department of Conservation Development are the official hosts to the convent

At the business sessions of the conference consi able attention will be given to the special problems the Southern States, few of which have as yet made great progress in the establishment of State parks, most of which contain groups planning such devel ment.

Special features of the conference will be trips points of interest in the vicinity, including a visit Linville Falls and Linville Gorge, where a State p of 50,000 to 60,000 acres is projected. Trips will be made to Lake Tahoma, Boone, Blowing Rock, other centers of picturesque mountain scenery.

This issue of the Forest Worker was prepared in the absence of the editor.

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FOREST WORKER

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State Forestry

East Has Bad Fire Season

e Eastern States experienced serious forest fire tions this spring. Careless smokers and brush ers were said to be largely responsible.

New York 65 forest, brush, and grass fires burned e time during the last week of April and the first in taking heavy toll in widely separated sections of tate. The State conservation commission warned st starting bonfires in woods or fields until a rain relieved conditions of dryness. Several and acres were burned over in the State. Ap- mately 30 acres of the thousand-acre Charles op Pack demonstration forest near Warrensburg, rty of the New York State College of Forestry, destroyed by fire. Other serious fires occurred in dirondack region.

Wisconsin fires were reported burning over ximately 20,000 acres on the last day of April.

e first half of April, with its dry weather, brought s fire troubles to the Southern Appalachian and nsas forests, particularly during the period from 11 to 14. Losses occurred at this time on henandoah and Natural Bridge National Forests ginia and the Ozark Forest in Arkansas. During period there was critical fire weather on the ngahela National Forest in West Virginia, on the ahala and Pisgah Forests in North Carolina, and e Unaka Forest in Tennessee, but these Forests able to keep down fire damage.

ad situation existed on the Shenandoah National t, where two large fires burned at the same time, n the south end of the Massanutten district, ing 3,000 acres of national forest land and 1,000 of private land, and the other on the north end of ost River district, burning over 5,000 acres of e land. Other large fires also burned around the . The fire on the Natural Bridge Forest burned than 6,000 acres of timbered and cut-over national forest land. The fires on the Virginia national forests broke the excellent fire record of the past few years for that State.

On the Ozark National Forest an outburst of incendiarism was the chief cause of trouble.

Press reports early in May carried news of forest and brush fires sweeping over hundreds of square miles in nine Eastern States. Fire starting in a wooden trestle near Nashua, N. H., aided by dry underbrush, swept through part of the town, rendered 1,500 persons homeless, and wrought damage estimated at $4,000,000. Large groups of regular and volunteer fire fighters fought flames which sprang up at several places in New Jersey. Large acreages burned in Massachusetts, and in West Virginia flames endangered oil wells and towns in their vicinity. Fires were reported also in Connecticut, Rhode Island, Delaware, Pennsylvania, and Maine.

California Prepares for its Annual Fight with Forest Fire

The California State Board of Forestry, at its meeting on April 3, reaffirmed its policy of adequate fire prevention and suppression on all forest and brush lands and grass and grain acreage adjacent to or intermingled with forest or brush-covered areas. The board also announced its decision to relinquish cooperative suppression and prevention on other grass and grain areas than those attached to forest and brush-covered lands to local fire protection districts as soon as such functions can safely be transferred to such agencies. In connection with its strengthening of policies best suited to permit most effective service in fire control at a minimum of public loss, the board determined that $800,000, exclusive of funds from Federal and other sources, is the minimum which the State can devote to fire prevention, if an effective organization is to be maintained.

Another significant decision of the State board of forestry, was its transmittal to the State engineer of the contents of a resolution adopted by a state-wide forestry convention recently held at Sacramento, urging that the forestry profession be represented in all matters concerning a state-wide water program. This point of view was considered particularly important in California, because the State's water resources are dependent upon protection of watersheds, the denudation of which would soon result in marked abatement of irrigation and municipal water supplies. The gist of the resolutions adopted by this state-wide meeting as well as of the policies outlined by the board are that unless adequate financial provision for effective forest and range fire prevention is made, an ever-increasing loss of some of the State's most valuable resources must be expected. Rapid highway extension and phenomenal growth of automotive transportation are but two of many factors contributing to the increase of fire hazards at a rapid rate.

Despite the campaign of education which the State board of forestry has carried on for several years, carelessness of smokers and spread of industrial enterprises into regions formerly rated as inaccessible or impracticable for manufacturing purposes are playing important parts in increasing the danger to watershed, forest, and range. This rapid increase of hazards has been entirely too frequently illustrated in recent years by destructive fires raging simultaneously in various parts of the State.

Progress in Forest Protection Reported in Washington

Of the 387,254 acres of land burned over in the State of Washington last year, 80.8 per cent was either cut-over, burned-over, or lands covered with young growth, according to George C. Joy, Washington State supervisor of forestry. It is difficult to estimate the loss in dollars, but there is a definite loss which will be more apparent in the future than now, he states.

"The sentiment is prevalent that artificial reforestation—planting trees—must be resorted to to secure another crop of timber," Mr. Joy says. "The most effective means of securing a second-growth crop of timber on deforested land is to protect that land from fire. We are growing millions and millions of young trees now and millions more are starting to grow each year, and this will continue until deforested acres are reforested if we can keep the fire off them.

"There are some areas which have been logged or are in process of being logged from which the timber has been swept clean, leaving seed trees too far distant for us to assume or even presume that natural reforestation will take place within a reasonable length of time. No doubt some of these areas will have to be planted.

"Keeping fire off the land is the most important vital factor in its reforesting, and that forestatio taking place now. The moneys expended for protect are bringing far greater results in producing a new c of timber than will ever be produced by any me of planting.

"I wish to thus evaluate the two means of reforest The general consensus of opinion is the other around, and many do not appreciate what is acc plished through natural processes."

Outside of the national forests 1,662 fires occurre Washington last year. Lumbering operations ca 150; railroads, 146; campers, 139; smokers, 382; b pickers, 38; brush burning, 187; lightning, 99; in diarism, 154; miscellaneous causes, 367.

The total acreage burned over was 387,254. M chantable timber killed was 153,168,000 board with an estimated loss of $35,826. The loss in logs logging equipment was $240,418, and to other prop it was $72,563, or a total loss of $348,807.

The cost of fire suppression was $135,222. The t cost for prevention and suppression was $481,957.

Quinnipiac Forest Trail Opened to Pu

At a field meeting held in Bethany Gap, Ar G. Dana accepted, on behalf of the public, the Qu piac Trail, which is the first completed portion o trail system of the Connecticut Forest and Park A ciation. Prof. Everett O. Waters, chairman of New Haven section, made the presentation sp and handed to Mr. Dana a blue arrow similar to t used in marking the forest trail, thus opening to people of Connecticut the association's trail sys All sections of the State were represented in the and enthusiastic gathering which was presided ove Col. T. S. Woolsey, president of the association.

Professor Waters, in his presentation sp thanked the many landowners who have given mission to cross their property. The finest coo tion has been received, and the public should rec cate, he said, by guarding against fire and vanda The actual trail construction has been done b Yale Outing Club, the Boy Scouts, and other volu workers.

Edgar L. Herrmance, chairman of the State committee, gave a brief history of the trail work outlined future plans. At Waterbury, Water and Hartford section chairmen with their volu crews are working on other portions of the trail system. The northern terminus of the Qu piac Trail will be Southington Mountain, wher Tunxis Trail will continue north to the Massach line and the Mattatuck Trail run northwest to Mohawk. Feeder trails will be provided ever miles, so that trampers may select round-trip rying lengths. Overnight shelters are among the for the future. The Connecticut Forest and Association expects to put the State in the lead e development of this increasingly popular form tdoor recreation.

fore and after lunch tramping parties were taken samples of the route. About 10 miles of the ipiac Trail west and north from Mount Carmel been completed and marked with spots of light- paint. The series of cliffs on York Mountain, Man's Hill, and Mount Sanford give a succession ide offlooks.

amp Ground Enlarged on People's Forest in Connecticut

e State of Connecticut is to receive another im- nt gift of land as an addition to the People's st in the town of Barkhamsted, Litchfield County, rding to an announcement by the Connecticut st and Park Association. Mrs. Harris Whitte- of Naugatuck, has given funds for the purchase of res as an addition to the Harris Whittemore camp nd on the People's Forest. Mrs. Whittemore's s in memory of her husband, the late Harris Whitte-, who was for many years a member of the State and forest commission.

e land is situated along both sides of the Farming- River and includes a small island. The gift en- s this public camp ground to over 61 acres.

e People's Forest has been made possible by gifts e directly to the State or received through the necticut Forest and Park Association of New en. The forest has an area of more than 1850 s and is devoted to outdoor recreation, timber ing, and the protection of wild life. Over 300 viduals and associations have so far contributed he fund for purchase of the forest, gifts ranging 25 cents to several thousands of dollars. Women's s, service clubs, outdoor organizations, and patri- societies, as well as many individuals, have con- ted to make the People's Forest one of the most resting and valuable State forests in Connecticut. onnecticut now has 17 State forests with an area ver 51,000 acres. The forestry program calls for ast 200,000 acres of State forests.

rmers will Collect and Market Native Plants

he farmers of Parsons, W. Va., have organized the t Virginia Native Plant Growers' Association for cting and marketing native plants. Most of these ers are living on marginal or submarginal lands, h they define as lands that will not produce a 00 standard of living from agricultural crops. These lands grow profuse crops of many ornamental native plants. The plants as they stand have little or no value, but when carefully collected and transferred they make splendid ornamental plantings.

The farmers of Parsons aim to make the collecting work a permanent business by transplanting small material and cutting back large material unfit for sale. The latter will soon grow into suitable collecting stock.

At present the Giant laurel (*Rhododendron maximum*), Mountain laurel (*Kalmia latifolia*), Flame honeysuckle (*Azalea calendulacea*), Pinxter bloom (*Azalea nudiflora*) are being collected. It is hoped that other materials can be added later as the work grows.

There is no chance of the extermination of native plants by such collecting as is being done at Parsons. Seed plants are left in all collecting areas for reseeding. Ten years hence there will probably be more plants in the collected areas than there are to-day, the association believes.

California Division of Highways Reports Fire Reduction Campaign

According to a report by T. H. Dennis, maintenance engineer, division of highways, State department of public works, 885 miles of roadside were cleaned of vegetation in 1929 at a cost of $54,000 to reduce the hazard of fires caused by careless motor tourists in California. The program for 1930, now under way, involves the clearing of 1,020 miles of road side at an estimated cost of $76,750.

The division of highways cooperates with the United States Forest Service in reporting and handling all fires in national forests pending relief, and has a similar agreement with the State division of forestry. Additional cooperation in fire reduction has been furnished by the division of highways by the clearing of rights of way through forested areas. To date this has been undertaken on the Alturas, Susanville, and Trinity laterals, on the Placerville-Lake Tahoe, Auburn, Big Oak Flat, Kit Carson, Ebbetts Pass, Sonora Pass, Pacific, Redwood, and Downieville highways. The importance of this work has been recognized, and special provisions concerning clearing have been written in all construction contracts within forested areas.

Georgia Highway Forest Demonstrations Planned

Forest demonstrations are to be established by the Georgia Forest Service in cooperation with local civic organizations along main highways of the State. The main objects of the demonstrations are to show how natural reforestation will come about where fires are kept out and how methods of thinning and other management will make the new growth develop rapidly and economically.

Large signs are to designate these demonstration acres and smaller signs will tell of the particular work being done. Local civic organizations are to sponsor these undertakings in the interest of reforestation and forest management in their respective territories.

Several sites in the State have already been selected and signs for marking them are being made. As a result of this undertaking the Georgia Forest Service hopes to stimulate greater interest in protection of forests from fire and in growing forests for profit.

Georgia Introduces Blight-Immune Chestnuts

The Georgia Forest Service has planted several thousand chestnut seedlings grown from seed of a European variety that is believed to be immune to blight. These plantings have been made at the State forest park at Neel Gap, the planting stock being furnished by the United States Forest Service.

No hope is held out for saving the native chestnuts from the blight that has moved steadily from the north down the Appalachian chain of mountains. The chief hope now of having any chestnuts in the future is believed to be in growing varieties that have proven resistant to the disease.

Studies in blight resistance of chestnuts are being made by the Georgia Forest Service in cooperation with the Georgia Experiment Station which will carry on some research work at its mountain experiment station near Blairsville. Dr. B. B. Higgins, of the experiment station, one of the leading authorities on plant diseases in this country, will have immediate charge of the studies of chestnut blight.

Money from Forest Products

The Farmers Federal News reports that the forest products department, organized by the North Carolina Farmers Federation in January (Forest Worker, January, p. 1) has marketed 95 carloads of forest products for the farmers of western North Carolina in the first three months of its work.

These products consisted of chemical wood, acid wood, locust wood, locust posts, walnut logs, poplar logs, ties, and shrubbery. The variety of the products shows how difficult it would have been for the individual farmers to have marketed them to advantage if they had not had the assistance of the federation in doing this, the report says.

Not only is the new department bringing in new money to the farmers of the mountains, but it is also, it is stated, "instrumental in creating a spirit of optimism among them." The farmers are learning how to make the most of their opportunities.

Campaign to Protect Minnesota's Whi Pine From Rust

At the call of the State commissioner of forest foresters, plant pathologists, horticulturists, and oth scientists met in conference at University Farm March to outline an aggressive campaign to prot Minnesota's stands of white pine from destruction blister rust, which has become established in 12 co ties of the State.

Resolutions were adopted asking the State legi ture for an appropriation for cooperation of Fed and local State agencies in control measures and for enabling law to permit the counties to appropri local funds for its control. The consensus called for adequate studies of genetics and epidemiology related to control of the rust, and for an advisory co mittee to the commissioner of forestry and fire p vention appointed from his office, and from the St and university departments of agriculture, for the p pose of organizing, correlating, and activating edu tional work on the control of white-pine blister rust Minnesota, the State blister-rust control leader to as secretary of this committee.

Connecticut Has Six Forest Protecti Associations

Connecticut has 89,198 acres of forest land un protection by associations in cooperation with the St according to a recent report. The protection against fire and thefts of evergreens. The member the association assess themselves a few cents an and the State forestry department has an agreem with the association to match their expenditures at rate of 4 cents per acre per year. There are six s organizations in different parts of the State and pat men employed by each are doing very effective w the report states. The largest and oldest of th associations is the Talcott Mountain, in Hart County, which has an area of a little over 25,000 ac The other five, with acreages varying from about 21 acres to a little more than 5,000, are the Housatc Naugatuck Valley, Central Fairfield, Ridgefield, High Rock.

Texas Lumber Company Replants La

The planting of 5 acres of seedling pine trees fo search and demonstration purposes has recently completed at Conroe, Montgomery County, by Delta Land & Timber Co., in cooperation with Texas Forest Service. The planting was done on owned by the company within the city limits of Co d just across the road from a big sawmill where ands of feet of sawlogs are turned into lumber each y. Alternate rows of longleaf and slash pine were ned on 4 of the 5 acres, and the other acre was ned to loblolly pine. The area is surrounded by a g roof fence, and a large sign, erected by the com- n calls attention to the demonstration. Large ers of people visited the area during the planting many were surprised to find that pine trees could ansplanted. All expressed amazement at the vely simple method employed in setting out the trees.

ne Towns Vote Funds for Blister-Rust Control

O. Frost, State leader of blister-rust control in e, states that 56 towns in Maine have appropriated 2 for carrying on blister-rust control work this n in cooperation with the State and Federal Gov- ent. The largest appropriations were made by Harbor and Mount Desert, both summer resort s, their combined appropriation being $2,750. opriations in other towns varied from $50 to $350. . Frost tells of cooperation even from a certain which has a present population of 176, polls of but n estate value of $81,295, and an acreage of but acres. The town is an island at the mouth of the ebec River.

v York's Forest Recreation Facilities Being Greatly Enlarged

e work of developing State forest preserves for ational use by the people, which was first under- n by the New York Conservation Department in , will be given added impetus during the coming n by increased appropriations recently made able by the legislature.

ore work will be done than in any previous year in oving the trails in the Adirondack and Catskill ns. Open camps are to be built, new public camp are to be developed, and many of the older camp that have proven so popular with summer visitors be enlarged and improved.

eceipts from Connecticut Forests

eceipts turned into the Connecticut State treasury State forests for the year ending December 31, , amounted to $4,985.83. Of this amount 49 per was for stumpage including material sold on the p, rentals, etc., while 51 per cent was for materials by the department employees. Only a small part is latter item represents profit, but all the material has been for the improvement of the forest. In tion to material sold, 324 cords of dead wood were n to local residents who cut it under the super- n of the local rangers.

Conflict in Corn Borer and Fire Control Adjusted

Burning over last year's corn fields prior to May 1 is required in Connecticut in regions infested with the corn borer. This burning can only be done when it is fairly dry so that fire will run through the weeds. A complication arose in Connecticut because of a ruling preventing the issuance of burning permits during April except on rainy days or a day following a rain. In order to facilitate matters, the ruling has been modified to allow permits to farmers on days when there is little wind, provided they have plowed two or three furrows around their fields before burning.

Serious Forest Fires in Indiana

The dry weather of late March and the early portion of April caused a severe forest fire loss to the woodlands of Indiana. Only the prompt work of organized fire-fighting crews saved several thousand acres of timberland in the parks, game preserves, and State forests from going up in smoke. Nine incipient fires were blocked on State land within a period of two weeks. Three million acres of timberland and abandoned fields growing up to forest cover are without fire protection.

Massachusetts Woodlands Closed to Prevent Fires

The forests and woodlands of Massachusetts were closed during the spring fire season by proclamation of Gov. Frank G. Allen to all persons except the owners and tenants, their agents and employees, or those holding written permits from the owner or tenant.

The action was taken, according to the proclamation, because of the long-continued dry period, which had greatly increased the fire hazard.

Spring Fires Burn Over 10,000 Acres

More than 575 forest fires in Connecticut burned over an area in excess of 10,000 acres, to April 23, according to Robert M. Ross, forester for the Connecticut Forest and Park Association. Practically all of these fires were due to carelessness of men, women, and children with fire in and adjoining woodlands.

Some justices of the peace are too lenient in trying violators of the forest fire code, Mr. Ross declared. The forest land owners, according to these officials, are entitled to fire protection. City and municipal water boards have spent millions of dollars to protect watersheds so that the people may have an abundance of pure water. Forest growth on such property is of immense value, he said, and the unlawful fire builder threatens the welfare of whole communities.

Town Forest Supplies School Funds

In 1928 it became necessary for the town of Fryeburg, Me, to build an addition to its central school building. The cost of the proposed enlargement was estimated at about $7,500. The usual method of financing a school building is for the municipality to lay a heavy property tax or else issue bonds on long or short terms. In this case neither of these methods was followed. The town simply went to its own forest of white pine and cut and sold enough lumber to finance the work.

The exact cost of the renovations was $7,120. Every cent of this money went into the building. There were no overhead charges for printing bonds, or commissions, no attorney's fees. The town still owns enough standing timber to build another schoolhouse.

New Conservation Laws for New York

On May 4 Governor Roosevelt, of New York, signed nine bills affecting conservation of the State's natural resources. Most of these bills made appropriations purchase of lands for park and other conservation p poses. One measure provides for the establishment a nursery for the production of trees to be used planting along highways and makes an appropriati of $14,000 for this project.

◆

At its last regular session the Kentucky Legislati passed, over the governor's veto, a bill providing the acceptance of the offer of T. Coleman du Pont provide funds for the purchase of land at Cumberla Falls for a State park and to empower the park co mission to condemn land for park purposes when directed by the legislature.

◆

The Conservation Commission of Michigan, at April meeting, dedicated nine new wild-life sanctuai comprising a total of 912 acres.

Education and Extension

Michigan Features Forestry Train Over Pennsylvania Lines

The extension department of Michigan State College featured a forestry train over the Pennsylvania lines from the 14th to the 19th of April for the purpose of demonstrating to the owner of idle land how such land may be changed from a liability to an asset. The "Reforestation Special" was the first train of its kind in Michigan. The train consisted of three baggage cars for exhibits, one lecture car, one express car for carrying trees and lighting equipment, and one business car.

Every county traversed by the train has plenty of land which is better suited to forests than to farm crops. The purpose of the train was to demonstrate to the farmer and the landowner how best to put such land in profitable tree crops. The extension department had been working on the exhibits for some time and prepared object lessons showing every possible planting phase. Farmers and others were able to see actual plantings in miniature. The Michigan State College forest nursery furnished trees for the display which showed possibilities in selecting and grouping various tree species and the planting spacings ad cated. Those interested in controlling blow sa found an exhibit depicting this phase of tree planti Another feature was the farm windbreak, showing rieties of trees to use, arrangement, and bene received.

In addition to the tree-planting exhibits, there a display featuring a new organization for rural b and girls called the Michigan 4–H Forest Rang From just a few members this movement has gai to over 200 in a year's time. Other displays sho the uses of wood, especially the possibilities of grow white spruce for paper. One educational exhi showed all of the steps in paper making.

Other cars contained fire-prevention displays, forestation along public highways, and proper handl of the farm woodlot. The Conservation League Michigan had a car displaying live game and predat animals. Recreational use of forests was featured the Michigan Tourist and Resort Association.

At each stop an appropriate program was giv consisting of short illustrated talks and moving tures. School children had written essays on the s ject Why Reforest. At each stop along the line for essay submitted there was awarded a prize of a young spruce in a tub ready to plant. rees on ice were carried in the baggage car for dis- ution to those who had ordered planting stock. erts accompanied the train to explain the exhibits answer questions in regard to tree planting and er phases of forestry. Some 300,000 pine seedlings e distributed by the "Reforestation Special." So t was the demand in the communities touched by special that extra loads of seedlings had to be ed via airplane.

ire Campaign Launched in California

Fight Fires with Forethought" was the slogan of campaign which began in Kern County, Calif., on 1st of March, to continue until June 1. This paign was conducted by the agricultural extension ice and the State division of forestry in 41 com- ities in 13 California counties for presentation of essential facts of rural fire protection. Wood- ge Metcalf, extension forester, and J. P. Fairbank, ialist in agricultural engineering, carried on the onstrations and reported increasing interest in fire ection. A ranger or inspector from the State sion of forestry assisted at each of the meetings.

arious types of hand tools and back-pack water p outfits were displayed and proper methods of in attacking fires shown. Each meeting closed a demonstation of one of the new State tank fire ks, which proved so effective in combating fires season that four additional outfits are under con- ction now. The truck was shown pumping two ams from a reserve supply of water and also with small streams from spray nozzles using water the 225-gallon tank on the truck. The latter hod is that used in fighting grass and grain .

n important feature of the demonstration was a up of two miniature slopes of soil to show the effect re on the water supply. One slope was protected the natural humus cover of the forest and brush ls, while the other was unprotected. Two quarts vater were applied to each, with the result that the us-covered area showed percolation of the water, le most of that applied to the unprotected slope off the surface as a muddy flood. The importance ommunity clean-up of fire hazards in advance of fire season was stressed and attention called to the ctive work along this line being carried on by the te division of highways in applying Diesel oil and ning off grass and weed cover along roads through ortant range and grain districts.

he demonstrations during the month of April were ried on in the San Joaquin Valley and foothill nties.

Georgia Farm Boys Learn Farm Forestry

The Georgia State Board of Vocational Education has now included vocational forestry in the course of study of each of the 150 schools where vocational agriculture is being taught, according to the Georgia Farmer and Fruit Grower. The course in forestry has been developed in cooperation with the Georgia Forest Service.

To make the instruction of practical value, each of these schools has a woodland of at least 10 acres, which serves as a laboratory where practical forestry management is demonstrated by the teacher of vocational agriculture and by technically trained foresters. These school forests are leased by the owners to the trustees for a period of 10 years. During this time any income derived from the tract goes to the owner, but he has nothing whatever to do with policies of management. These policies are outlined by a representative of the State forest service and are carried out by the boys in the agricultural classes of the school where the tract is located. Each of these school forests has been studied by an expert of the State forest service and a map of it has been drawn to scale. This is a part of the working plan which the boys on each individual tract are to follow. Study material for use in forestry classes is obtained from the Georgia Forest Service, the United States Forest Service, the Georgia State College of Agriculture, and the American Forestry Association

The director of education of the Georgia Forest Service says:

> Students demonstrating outstanding qualifications as shown by school work will be awarded scholarships to summer forestry camps, where more advanced and practical work in forestry will be given leading to a certificate of vocational forester, which will recommend the holder for one or more of the positions of forest ranger, fire warden, timber cruiser, log and lumber inspector, superintendent of sawmills, manager of turpentine operations, superintendent of State forest parks, and other nontechnical forestry jobs.

Texas Forest Service Does Effective Educational Work

Public sentiment in favor of forest-fire prevention is becoming crystallized in east Texas, the State forest service reports, as the result of educational activities by which the service has brought local problems of forest protection to the school children and to the adult citizens of the timbered region throughout this part of the State. These activities include lectures at schools, churches, forestry meetings, and rural gatherings. The lectures have been supplemented by motion pictures showing the development of the tree from seed to maturity, the products and by-products obtained from trees, destruction by fires and means of prevention of such damage, and illustrations of tree farming and tree crops. Charts and maps are also used as illustrations, and bulletins on forestry subjects are distributed.

A specially constructed Ford car is used in transporting the moving-picture apparatus and the publicity material. This car is equipped with a generator and batteries for supplying current.

Educational work is also carried on in this part of Texas by the field force of 54 patrolmen, lookout men, and smoke chasers. During 1927 and 1928 these men made fire-prevention talks at 2,300 schools to 129,400 school children and teachers throughout the greater part of the piney woods region of east Texas. To these pupils 86,932 pieces of forestry literature were distributed, as were also more than 60,000 school-book covers carrying a forest-fire protection lesson. During this period the fire-protection force had over 46,000 personal interviews with farmers, stockmen, campers, and loggers, to whom 47,000 fire-prevention posters and circulars were distributed. Fire-prevention activities were further extended by the protection force in posting over 58,000 cardboard and cloth fire-warning signs on the roads and highways in east Texas. At the more strategic points 170 large metal-framed fire-prevention signs and 100 smaller fire signs were put up.

County Agricultural Programs for North Mississippi Include Farm Woodland Management

Farm woodland management is an important part of county agricultural programs in north Mississippi, according to D. E. Lauderburn, extension forester, and L. A. Olson, district extension agent.

The extension forester has outlined plans for future work with 14 north Mississippi agents. In most cases the work will be started with a survey of the farm woodland resources and conditions and a study of the markets for farm woodland products, in which survey the county agent will be assisted by the extension forester. These surveys will be made this spring and summer and plans will be perfected for demonstrations and campaigns for the coming fall and winter. The kind of demonstrations and campaigns to be planned will be determined by the needs in each county. Demonstrations may cover such activities as timber estimating, thinning, improvement cutting, selection cutting, planting, establishment of tree nurseries, determination of rate of growth and probable future yield, firebreak construction. Compaigns for fire protection and for the reclamation of eroding lands may be included in the plans for farm-woodland development and the utilization of waste farm areas.

In addition to the reclamation of eroding lands by planting, there are the important problems of protecting from fire the thousands of acres of cut-over woods and the forest growth coming up in abandoned fields, and the improvement of this timber growth by cutting out the weed trees where possible and the thinni thick stands.

H. C. Mitchell, assistant State forester, in cha work in north Mississippi for the State forest se with his headquarters at Tupelo, is also working the county extension agents.

American Forestry Association Exh Truck Tours East

According to the American Forestry Associatio special exhibit truck of the southern forestry e tional project of the American Forestry Associ and the States of Georgia, Florida, and Mississip made a 4,000-mile tour of the Eastern States. teen States and the District of Columbia were vi and the truck was on display at the Southern Fo Congress, at Memphis, Tenn.; the annual meeti the Izaak Walton League of America, at Chicago and at the annual meeting of the American Fo Association, at Minneapolis, Minn., April 29, 30 May 1.

The truck left Marianna, Fla., April 8, in cha E. P. Simmons, of the southern forestry educa project. It exhibited at Birmingham, Ala.; Men Tenn.; Little Rock, Ark.; St. Louis, Mo.; Loui Ky.; Indianapolis, Ind.; and Chicago, Ill. Chicago the truck went to Madison, Wis.; Minnea Minn.; Cedar Rapids, Iowa; Burlington, Iowa; S field, Ill.; Columbus, Ohio; Wheeling, W. Va.; ington, D. C.; Richmond, Va.; Raleigh, N. C.; C bia, S. C.; Augusta, Ga.; and finished its tour M at Thomasville, Ga., after which it operated in M sippi for a month.

The truck, created and designed by the Am Forestry Association and the Florida Forest Se was made possible by a special appropriation b Florida Forestry Commission. It is ultramode equipment, featuring an amplifying unit, ele displays and motion pictures. On exhibit in F during the winter it was viewed by more than million people.

Boy Scouts Render Woods Servic

As a reward for useful forest work, a Boy Scout of Everson, Pa., received a meritorious service early in April. The award was made upon the of the troop, which shows that during the week ning June 24 of last year it did good service on lands by removing brush, leaves, and other i mable material from community picnic ground that during four picnics members of the troop pa the adjoining woods for a radius of 2 miles to against the setting of fire by negligent smoke hikers. On July 4, also, the troop patrolled the near Everson to detect fire set by fireworks. I whole 1929 spring forest fire season the Boy Scouts this troop assisted the forest fire warden in extin- ishing several brush fires. Individual awards were de to two members of the troop for special service.

e East Texas Chamber of Commerce Develops Farm Forestry Program

A farm forestry program for the East Texas Chamber Commerce has been outlined, with special emphasis the conception of farm timber as a crop and the ne- sity of its protection from fire. In carrying out this gram the officials of the chamber of commerce will intain close cooperation with the Texas Forest vice and the State extension service.

askan Schools Compete in Forestry Contest

A contest is being conducted in the Alaskan schools the best essay based on an outline for the study of forests of the territory distributed in the schools of ska last year from the United States Forest Service ional office at Juneau. The prizes in this contest, ered by the American Forestry Association, will be ronze medal to the pupil submitting the best essay each division and a larger bronze medal mounted on alnut block to the school in each division from which winning essay originated. The successful pupil l retain possession of the smaller medal and the mounted medal will be kept by the winning school for one year and sent to the school winning in the subsequent year. It will become the permanent possession of a school if won three years in succession. All white schools—Territorial, Bureau of Education, parochial, and mission—are eligible. Any pupil, of the eighth grade or under, who is a regular student of such schools and has taken at least 10 lessons in the "Outline for the Study of Alaskan Forests" and made at least two field trips under the direction of the teacher, may compete for the individual medal.

The subject of the essay is to be selected by the individual pupil to cover some phase of Alaska forestry or wild life. Although the essay contest is based on the "Outline," competitors may avail themselves of any authoritative information on the subject discussed. The importance of this study has been emphasized in letters and bulletins sent to superintendents and teachers. The governor of the Territory is sponsoring this educational contest and has presented the project in person in many villages of southeastern Alaska. A similar contest was held in the schools of Alaska during the school year 1928–29, based on the same course of study.

* * *

The Harvard Forest, consisting of 2,100 acres has cut over 4,000,000 feet of timber since 1908. During the last five years the gross income has averaged $15,000 a year and the net income has averaged $3,000 a year.

Forest Service Notes

egional Foresters Meet in Washington to Discuss Problems of National Forests

Regional foresters from the nine national forest gions met at the Washington headquarters of the ited States Forest Service, on March 17 for a two eks' conference with the Chief Forester and chiefs of anches on important problems of national forest ministration.

Fire protection was one of the principal subjects dis- ssed. The program included a thorough review of national forest areas now enjoying satisfactory pro- tion, fairly good protection, or unsatisfactory pro- tion, as a basis for working out a plan of future otments for fire protection improvements. The rest Service objective of "safe hour control" requires d and trail systems, detection and communication stems, and equipment and personnel adequate to enable a sufficient force of fire fighters to reach every incipient fire in time to hold the burned area to a minimum.

Other matters up for discussion included business methods in national forest administration, development work, planting, demonstration projects in timber growing, and special training of the Forest Service workers.

National Forests of Southwest Increase in Area under Land Exchange

In the last eight years a total of 178,773 acres of land has been added to the national forests of Arizona and New Mexico under the provisions of the land exchange act of 1922, according to M. M. Cheney, assistant district forester in charge of Lands, United States Forest Service. Only 7,643 acres of land has been granted in exchange, so that the net gain in acreage to the national forests to date is 171,130 acres.

Aircraft Given Part in Forest Protection Plans

Air patrol for spotting fires is the latest development in the forest protection plans for national forests in the Lake States region, E. W. Tinker, regional forester, announces. Recently he returned from Washington with the first Federal allotment for permitting contracts for hire of airplanes for fire detection.

Hydroplanes were used for fire fighting last summer in the northern part of the region, Mr. Tinker said, but this is the first air patrol planned for the national forests in this region and the nine Federal purchase units on their way toward becoming national forests.

Planes will be used particularly during periods of heavy smoke when visibility from lookout towers is limited. The numerous bodies of water in the national forest areas afford natural landing fields for planes, and fires which are invisible to the lookout in his smoke-screened tower can be readily spotted from the higher altitudes.

In addition to use of planes for fire detection, the plan followed last year of transporting small crews of men with equipment by plane, will be followed. This plan, enabling quick action, according to the regional forester, saved the Government many thousands of dollars last year and prevented the burning over of hundreds of acres of national forest land.

Representatives of Lake States Land Economic Surveys Confer

Representatives of the land economic surveys in the three Lake States met in the State Capitol at Madison, Wis., on Saturday, April 19.

The object of the conference, which was called by the director of the Lake States Forest Experiment Station, was to decide on a method for collecting volume and growth data in connection with the land economic survey work. Heretofore little has been done in forest mensuration on the surveys, and each State has used a method or system of its own. It is obvious that such procedure would not give comparable results. This meeting was therefore called to decide on a common method for collecting the timber data. The following method was adopted:

The timber data will be gotten from a strip survey instead of from sample plots.

The diameter of all the trees that are 4 inches or more will be measured with calipers at a point 4½ feet above the ground. If the average diameter of the stand is between 3 to 6 inches, the strip will be 8¼ feet wide. If the diameter is 6 to 9 inches, the width of the strip will be 16½ feet and for average diameters that are 9 or more inches, the strip will be 33 feet wide. The strip crew will work on areas that h ready been mapped; it will then know the area types it is in and the lengths of the strips in eac

The trees will be tallied to 1 inch diameter Each fiftieth tree tallied will be a sample tree diameter will be recorded separately also to a t an inch.

The sample trees will also be studied for infor on growth. The total age at breast height gotten, and the number of years required to gr last 1½ inches in radius. The total height of t will be measured with a hypsometer and the height growth for the last 10 years will be reco

If the average diameter of the stand is 3 in less, the percentage of stocking will be dete considering the distribution over the area.

Dead and down timber will be tallied sep when it is still sound.

Notes will be made on the ground cover, Bureau of Soils classification of the soil will be

It was suggested at the meeting that the Lak Experiment Station make yield tables for th qualities that will be applicable for the thre States.

When the foregoing work has been done, it possible to go onto a tract of land and state its growing possibilities for the various native Such a statement of timber-growing possibilitie not be a mere conjecture, but it would be base knowledge derived from past investigation.

Besides their use for statistical purposes data will be a basis for placing values on suc which do not have any information as to th cultural crops raised upon them. By using classification and then getting the timber- possibilities on the land its value can be dete This value will be based upon the land's ab yield an income. It will not be based upo prices or high-powered salesmanship.

Progress in Insect Control Work i Northern Rocky Mountain Regi

About 300 men are now employed on the d'Alene National Forest insect-control job. these are engaged in spotting infections or i lishing camps for the crews to be employed in work which is just getting under way.

Spotting work on the Clearwater National F pretty well finished, and it is certain that the j will be very much less than was anticipated. A as can be determined the number of trees to be will amount to only about 500. This will ma sible the transfer of a considerable part of the water force to the Kootenai Forest, where t ly needed. W. E. Buckingham is in charge of the k, assisted by G. M. De Jarnette.

. E. Fields is in charge of the control work on the tenai, where it is reported that treatment on a ber of small units has already been completed. job here involves five or six different drainages and ral camps. Treating work is well under way.

Tree Planting Season Opens

bout 1,250,000 trees will be planted in the national sts of Colorado and Wyoming this spring. The planting camp was opened on April 15. Douglas nd western yellow pine will be used almost exclu- ly.

he trees for the 1930 planting in the Rocky Moun- region were raised at the Monument Nursery, lo- d near Monument, Colo. This is one of the largest green nurseries in the West. The purchase of land led for the expansion of the nursery, which was au- ized by Congress in 1928, was recently consummated. en this nursery land is developed it will be possible raise 2,000,000 trees for distribution annually. e tree planting is necessary to make headway on large burns in the national forests of this region. se burns total 900,000 acres in Colorado and about 000 acres in Wyoming.

n Mutilation Runs High on National Forests in East

ecause so many persons see the road and trail and ndary signs on the national forests as handy tar- for a display of markmanship, as suitable places carving their initials, or as objects for some other of mutilation, the Forest Service, United States artment of Agriculture, is put to added expense aintaining its signs and markers on the national sts for the benefit of the public.

sign survey just completed on the national sts of the eastern district showed as high as 89 cent of the signs mutilated on one forest, two s after they had been erected. For 13 national sts in the region, the percentage of signs found ilated at the end of the second year averaged 26 cent for road signs, 17 per cent for trail signs, er cent for gibbet boundary signs, and 18 per cent other signs.

t the end of the first year, 16 per cent of the road s were mutilated, 9 per cent of the trail signs, er cent of the gibbet boundary signs, and 14 per of the other signs.

Congress Provides for Forest Products Laboratory Buildings

The Secretary of Agriculture is authorized by act of Congress which became law on April 15, to accept land offered by the regents of the University of Wisconsin as a site for the construction of a building or buildings to be used by the forest products laboratory of the United States Forest Service, at Madison. The act also authorizes an appropriation of $900,000 to cover the cost of constructing and equipping laboratory buildings. The Senate added an amendment to the pending Department of Agriculture appropriation bill making this authorized amount available during the fiscal year 1931.

Visitors to the National Forests During 1929

A total of 31,758,231 visitors made recreational use of the national forests of 25 States, Alaska, and Porto Rico during 1929. Three-fourths of these visitors to the forests were transient tourists, while picnickers, campers, hotel and resort guests, and special use permittees made up the other fourth in the order of numerical rank. Seven out of every eight traveled in automobiles. The California region had more than half of all such users of the national forests, Colorado and New Hampshire had more than 2,000,000 visitors each, Oregon had nearly 2,000,000, Arizona, New Mexico, and Washington, more than 1,000,000 each.

Deficiency Appropriation Made for Forest Fire Fighting

The first deficiency appropriation, approved and signed by the President on March 26, made available among other items, $3,300,000 for expenses incurred in fighting forest fires on the national forests during the past year, $45,000 for fighting forest fires on the Indian reservations, and $180,000 to start work controlling forest insects on certain national forests in the northwest.

* * *

On May 1, 1930, the boundary line between the eastern national forest region and the Lake States region was modified by including in the latter the States of Iowa, Missouri, Illinois, Indiana, and Ohio, which were formerly within the eastern region. This change does not affect the existing territorial divisions in research and Clarke-McNary Act inspection.

General Forest News

Southern Forestry Congress

The Twelfth Southern Forestry Congress was held at the Peabody Hotel, Memphis, Tenn., April 10, 11, and 12, with President George T. Houston, of George T. Houston & Co., Memphis, Tenn., presiding. R. S. Maddox, State forester, Nashville, Tenn., acted as secretary.

This congress was one of the best attended meetings of the series to date, with a registration of 250, 168 of whom were from outside of Memphis. At the four regular morning and afternoon sessions a large number of papers were presented, including among others the following subjects: Conservation of Forests, Waters, and Soil, by E. A. Sherman, associate forester, United States Forest Service; Possibilities of Securing New Crops of Timber in the South, by E. L. Demmon, director of the Southern Forest Experiment Station; Our Forest Needs, by Dr. Wilson Compton, secretary-manager, National Lumber Manufacturers' Association, read by D. R. Brewster, district manager of the association, Memphis; Continuous Operation from Second Growth Timber, by C. W. Strauss, secretary, Malvern Lumber Co., Perla, Ark.; Growing Timber as Security for Long Term Loans, by W. L. Hall, president, Hall-Kellogg & Co., Hot Springs, Ark.; Forest Fires in the South, by James D. Lacey, president, James D. Lacey & Co.; Relation of Private to Public Responsibility in Forest Fire Protection, by Page S. Bunker, State forester of Alabama; Money Handled by Banks in Connection with Forest Products, by J. J. Heflin, vice president, Union Planters National Bank & Trust Co., Memphis, Tenn.; Forest Legislation, by G. H. Collingwood, forester, American Forestry Association; Forest, Game, and Wild Life, by W. B. Bell, United States Biological Survey; Utilization as a Stimulus to Industrial Forestry, by R. D. Garver, United States Forest Products Laboratory, Madison, Wis. Herbert N. Wheeler, United States Forest Service lecturer, gave an illustrated lecture on forestry and land use at the close of the afternoon session on the first day.

Mr. Sherman cited in his address the results of actual experiments which indicate that even on a grass or forest slope of less than 4 per cent, 22,000 cubic feet of water per annum is saved to the acre that would be lost by surface run-off from every acre of a fallow area of similar slope. When applied to a township, h
this means 500,000,000 cubic feet of water,
10,000 townships, the effect of vegetative cover
ures 5,000 billion cubic feet of water. Obviou
said, it makes a tremendous difference in the regi
a drainage course whether its volume of mois
transmitted to it as immediate surface run-off or
steady flow of perpetual springs.

"The flood problem," Mr. Sherman said, "w
be solved until floods no longer take place. Flo
an evil not merely because of what they do but b
of what they are. The settler along the lower
sippi fleeing for his life knows the flood mere
criminal from its assault on his life and pr
But in addition to being a criminal assailant, th
is also a thief which has stolen from the lands
farmer farther up the valley his richest soil, fa
treasurer of nitrates, the water needed by the f
of Oklahoma, Kansas, Nebraska, and points no
their crops, and power which if appropriately ha
would turn wheels for a great industrial popu
And this great raging thief is possessed of a m
idea of burying all his stolen riches in the sea
man's reach or hope of recovery."

Mr. Demmon, in discussing forestry possibil
the South declared that by no stretch of the in
tion can it be conceived that the estimated 190,
acres of potential forest land in the South will be
for agriculture for many years to come. A
part of it may be found profitable for the produ
cattle and other livestock, and a small percenta
will be cleared for agriculture, but the remaind
speaker maintained, if allowed to lie idle or to p
only a fraction of its potential capacity must r
the detriment of the entire region. On the othe
if these lands can be made to return a profit
owners, he predicted the stabilization of comm
the perpetuation of industries, and the provis
work for a considerable proportion of the popu
making for widespread and well-founded well-b

State Forester Page S. Bunker, in compari
relation of private and public responsibility in
fire protection traced his interest in the longle
forests of the South back over a period of 50 y
the time when there were but few lumber ind
below the Mason and Dixon line other than coa

xport and small sawmills for local demand, when ake States were the center of production, and white was the criterion of value. He told of the gradual ather reluctant migration of white pine lumbermen e southern forests, of the small understanding and eciation of these resources carried over from their er experiences, of the unchecked menace of forest and of the poor management which helped to “kill oose that laid the golden egg.” As an offset to past adverse conditions he expressed it as his on that all forward-looking agencies in the South y are united in the suppression of forest fires, but there will be for many years a clinging to old ms, and that incendiary and malicious burnings ontinue until ruthlessly suppressed. “This calls e combination of State and Federal fire protec- ” he said, “with intensive patrol, lookouts, fire fire-fighting equipment, and organization on idual properties under forest management. It is bly too soon to expect intensive State control, but te owners who vision the future of forest pro- on can largely control their own destinies.”

roughout the conference special stress was laid hardwoods, with the meeting culminating in a trip to one of the hardwood parks, of Memphis, e a unique timber estimating contest was staged by Brewster. Approximately 2 acres of old-growth vood had previously been estimated by two t cruisers, the sealed estimates being broken at the usion of the contest and the two averaged to serve e measure of efficiency. It was a matter of con- ble interest that the six prizes were awarded to nen engaged in the manufacture of hardwoods wo college professors.

eature of the Congress was a series of exhibits near trance to the hall, with striking “before and after” ations, which gave special emphasis to the nation of gullied lands in Tennessee, in which State Maddox has been actively engaged for many years.

C. McCormick, director of the Southern Forestry ational Project of the American Forestry Associa- featured the program of an evening session with a ed report of the cooperative educational projects being carried on in Mississippi, Georgia, and la, illustrated by several forestry films used in the A forestry news reel directed and photographed r. McCormick was one of the features of this ainment. The new Florida forestry exhibit was available for inspection and received a great of favorable comment. This truck was on its rom Florida to Minnesota for exhibition at the l meeting of the American Forestry Association nneapolis April 29 and 30 and May 1.

e following officers were elected for the ensuing President, Albert L. Strauss, president of the ern Lumber Co., Perla, Ark.; vice president, W. L. Hall, president of Hall-Kellogg & Co., Hot Springs, Ark.; secretary, W. H. Brooks, of the Arkansas Pine Association, Little Rock, Ark.; assistant secretary, L. E. Bodie, Arlington Hotel, Hot Springs, Ark. The meeting place selected for the next congress is Hot Springs, Ark.

The following resolutions were adopted by the Southern Forestry Congress:

1. Whereas the rapid depletion of the hardwood stands in the South is constantly increasing the amount of idle cutover land and will eventually impair very seriously the foremost position of this region which produces approximately two-thirds of the hardwood timber requirements of the entire United States; and

Whereas we believe that a thorough knowledge of the problems of forest management, forest utilization, and profitable use of idle land in this southern hardwood region is urgently needed and can best be obtained through an adequate program of forest research.

Resolved, That we urge Congress to provide funds for this purpose, to be made available at the earliest possible date.

2. *Resolved*, That we recommend the practice of selective logging to all southern timberland owners in the belief that this method of cutting offers one of the best means of keeping forest land productive and of assuring the permanency of the forest industries of the South.

3. Whereas the forest fire weather warning service of the United States Weather Bureau has been successfully functioning in several forest regions of the United States for a number of years; and

Whereas we believe that similar service would be of great benefit in the Southern Appalachian and surrounding territories; and

Whereas authorization for preliminary investigations into the relationship of weather conditions to forest fires is contained in section 6 of the McSweeney-McNary forest research act.

Resolved, That we urge the Secretary of Agriculture to provide in his estimate sufficient funds for this work at the earliest possible date.

4. *Resolved*, That we earnestly request the Secretary of Agriculture to allot increased funds for investigations by the Bureau of Entomology leading to the control of harmful forest insects in the South.

5. Whereas the relation of forests to the regularity of streamflow is as yet little understood.

Resolved, That we urge the Secretaries of Agriculture and Interior to provide for investigations of this subject in the southern Appalachian regions by appropriate Federal bureaus in cooperation with the States.

6. Whereas considerable areas of devastated land are now unremunerative, we recommend that such of these lands as can not profitably be put in productive condition by industry be acquired by public agencies for such public purposes as may be necessary and desirable.

7. Whereas it appears that the great problem of controlling the floods of the Mississippi River can only be solved by the adaptation and coordination of four principal remedial measures—namely, (1) levees, (2) spillways or by-passes, (3) reservoirs, and (4) forests,

Resolved, That we urge the concurrent use and prompt adoption of all of these measures, each in its proper field, without waiting for the final completion of the others. Just as levees, dams, and spillways may all be undertaken simultaneously, each as the necessary part of a comprehensive plan, so the program of forest protection and development should be promptly and energetically carried forward, with proper consideration also to the protection and conservation of the forests of the lowlands.

8. Whereas tree-killing insects are exacting an annual toll from our national forests comparable to that caused by fires, and,

Whereas the present methods of financial control delay action by 12 to 18 months after the situation is recognized as critical,

Resolved, That the Southern Forestry Congress urges studies which will lead to the drafting and passage of a law which will make possible the authorization of funds to allow immediate attack upon forest destroying insects.

9. Whereas the resources of the national forests are annually in danger from fire, and

Whereas the present systems of roads, lookout towers, and other permanent improvements are inadequate to the magnitude of the situation,

Resolved, By the Southern Forestry Congress, that the plan embodied in pending legislation authorizing annual expenditures for such improvements on national forests, has its indorsement, and this body urges the early passage of this bill by Congress.

A resolution was offered in regard to the tariff on lumber which failed of passage on the ground that the subject was not germane to the proceedings of a conservation congress.

Fifty-fifth Annual Convention of the American Forestry Association

The American Forestry Association held its fifty-fifth annual convention at Minneapolis, Minn., April 29, 30, and May 1. Alexander Legge, Chairman of the Federal Farm Board; Glenn Frank, president of the University of Wisconsin; Theodore Christianson, Governor of Minnesota; and other nationally known speakers were on the program.

Forest problems of national character were discussed, but the keynote of the convention was the consideration of problems affecting the Lake States. Major attention was given to forest-fire prevention and control, reforestation of cut-over lands, forest taxation, forest research, and wild-life problems. An exhibit truck used in the association's southern educational project now in its second year in Georgia, Florida, and Mississippi, was shown at the convention, and its use and equipment were demonstrated.

A field trip to Cloquet, Minn., was made on the closing day. The city of Cloquet is a forest-supported community and is reputed to be the most diversified wood-fabricating center in the United States.

The president of the American Forestry Association, George D. Pratt, and the mayor of Minneapolis made brief addresses at the opening session. The Governor of Minnesota spoke on The State's Responsibility in Safeguarding Its Natural Resources. Other speakers included Nils A. Olsen, Chief of the Bureau of Agricultural Economics, United States Department of Agriculture, who spoke on Deforested Land—A Challenge to American Welfare, and Ward Shepard, National Conservation Committee, who pre paper on Forest Reconstruction.

At the afternoon session of the first day th ers who discussed the various phases of the subject—The Land and Forest Situation in t States—were Raphael Zon, director of the Lal Forest Experiment Station; Benjamin H. Hil the University of Wisconsin; Alexander Legge, C of the Federal Farm Board; and Mrs. Sam president of the Minnesota Federation of Clubs.

At the annual banquet, Lotus D. Coffman, of the University of Minnesota, acted as toa and the speakers were Stafford King, chairm conservation committee, American Legion, a Frank, president of the University of Wisconsi

Glenn Frank in his address on Forests and th of America asserted that the conservation mov a comprehensive challenge to all the varied our commonwealths—public and private, so scientific. "Conservation," he said, "is not a that can be reduced to any single effort or b out to any single agency. The business r banker, the legislator, the scientist, the educ have a part to play and the whole America must create a compelling atmosphere of devoti cause of conservation that will bring every lag the ranks."

"We are not suffering from lack of an int conceived conservation program," he continue experts, scientific and economic, have done t admirably. We are suffering from lack of a tion mind. The primary task of the conserv is to transform the millions of hand-to-mout day Americans into a conservation-consciou to create a public mind that is forest wise. Ba legislative and technical engineering that m into the administration of a forestry program a vast deal of spiritual engineering that must to insure the creation and continuance of a hensive and statesmanlike policy."

President Frank discussed the factors believed should enter into an effective fore gram: (1) The development of public forests— State, and municipal; (2) working cooperation the Government and private owners of tim that will make reforestation economically involving fire protection and equitable taxa the maintenance of a constant and compr research and information service from State o laboratories to the private owners of forest la (4) the exercise of some degree of public ove forest lands, even when privately owned, to continuing productivity.

"There are a hundred and one technically elements that must enter into an intelligen ceived forestry program," President Frank said elements I have mentioned would seem, however, e minimum starting points of policy. If, through- this Lake region, we could act fully on these four lamental policies, I think we should realize an naginably rich return on our efforts."

he two sessions of the second day's program had heir general subject: Solution of the Lake States blems. The various phases of this subject were ussed in addresses by George Bishop of the Upper insula Development Bureau, Michigan; R. Y. art, Chief, United States Forest Service: William ithe, chairman of the Wisconsin Conservation mmission; W. A. Holt, president of the Holt Lumber Wis.; Paul Hansen, of the firm of Pearse, Greeley Hansen, Chicago; Frank A. Waugh of the Massa- setts Agricultural College; Paul G. Redington, ef of the United States Biological Survey; and ert Stoll, jr., of the Detroit News.

he primary objectives of the Federal Government ts forest land acquisition program in the Lake tes were pointed out by R. Y. Stuart, Chief Forester, n address on Federal Acquisition as a Lake States idote. The Chief Forester declared the major ectives of the Government in its Lake States uisition program to be the promotion of forest wth, improvement of waterflow conditions, and, ely affiliated with these functions, more facilities outdoor recreation and for wild life conservation.

In working toward these objectives," he said, e tracts purchased will be developed and used to nonstrate sound forest practices and the coordi- ion of forestry with other forms of land use. This require effective methods of fire control, adequate tems of forest improvements, forest planting, provement cuttings, and the application of the tained yield principle of management. Consider- on will be given also to recreation and wild life nagement."

Major Stuart emphasized the fact that the Federal gram was complementary to State and private rt, there being no attempt to in any way gain trol of the forest land situation in this region. cited the fact that there are estimated to be 100,000 acres of forest land in the three States, of ch over half is in a nonproductive or poorly pro- tive condition. There are now four national forests these States: The Huron, with 237,135 acres; the chigan, with 27,835 acres; the Chippewa, with ,350 acres; and the Superior, with 845,406 acres. addition to the established national forests, four chase areas have been approved in Michigan, three Wisconsin, and two in Minnesota, within which not exceed 2,500,000 acres will be acquired. So that in the program of purchase planned, together with the eage now in Federal ownership, would represent less n 6 per cent of the forest lands in these States.

Reforestation of Poor Land Urged by Farm Board Head

Restoration of the woodland to the American farm was urged by Alexander Legge, Chairman of the Federal Farm Board, in a recent network radio address. He said:

It should require no great amount of argument to convince the grower that if a somewhat reduced production would result in bringing him more money than he now is getting with a larger production, it would be foolish for him to expend the time and labor and to exhaust the fertility of his soil in producing that excess when the result of such excess production would be only to bring him a lower financial resturn than he might have had by adjusting his production downward to a point where the consuming demand would absorb what he grows at a reasonable price.

The percentage of decrease in production of most commodities, if properly distributed—that is, if the reduction were made by all producers would not be sufficiently large to seriously change the farmer's present operations. Furthermore, in cases where by the development of new foreign markets or expansion of existing markets abroad as a result of an increase in the purchasing power of consuming countries, it is found possible to dispose of an increased quantity of a commodity, the board hopes to give the farmers this information early enough for them to take advantage of the changing conditions in the planting of their crops.

Meanwhile, we are immediately confronted with what use to make of the present cultivated acreage that would not be required in such a modified program. Many good suggestions have come to the board on this subject. * * * I wish to offer one that seems to meet with very general approval—namely, reforestation.

Most people think of a reforestation program along the lines of large areas, commonly accepted in terms of the future timber supply, but there is another kind of reforestation that is equally important—in fact, more important to agriculture—and that is the reforestation of the so-called "woodlot." In the past the woodlot has played an important part in the prosperity of a large percentage of our farmers. It has furnished shade for livestock in summer and shelter in winter, posts for fences, firewood for the houses, and in other ways been useful to the farmer.

In many areas this woodlot is disappearing. Why not restore it? In doing so we would only be following the example of many of the older nations that in the past have had to meet a similar situation as that now confronting us. If every American farmer were to devote 5 per cent of his present acreage to this form of reforestation he would have gone a long way toward meeting the problem of excess production and at the same time have added materially to the future value of his farm.

The different States have a very important part to play if any campaign to restore the woodland to the American farm is to be successful. That is in the matter of taxation. Some States have already passed legislation exempting from taxation land that is planted for the purpose of reforestation. Other States should do so, being specific to make such exemption apply to the woodland as well as land planted to timber on a strictly commercial basis.

Forest Supervisor Inspects Virgin Islands

At the request of the Bureau of Efficiency, which has been making a study of the Virgin Islands, W. P. Kramer, supervisor of the Luquillo National Forest, Porto Rico, was recently detailed to make a report on forest conditions there. Mr. Kramer's report gives some interesting facts about these island possessions.

There are over 100 islands in this group, which is about 40 miles east of Porto Rico. Most of them are small and uninhabited. Only three of the islands are important: St. Croix, containing 53,000 acres; St. Thomas, with 16,000 acres; and St. John, with 12,000 acres. The topography of these islands is rolling to rough and their highest peaks rise to 1,500 feet elevation. The climate, of course, is subtropical, with a rather even temperature, varying between 70° and 90° throughout the year. The population has been steadily decreasing, and is now about 20,000.

Originally the islands were entirely covered with a stand of tropical hardwoods, which, however, have largely been cut and much of the area is now in a denuded condition. St. John still has some second-growth timber and a number of slightly culled virgin areas, but on the other islands the forest areas have now been largely taken by brush. St. John is the center of the bay rum industry for which some bay forests are being grown, but this industry has been on the decrease in recent years.

The main agricultural crop is sugar cane, although a beginning has been made in raising vegetables and citrous fruits. Cattle raising also assumes some importance. Approximately half of the islands, or about 40,000 acres, is suitable only for the production of forest crops. Supervisor Kramer reports that about 20,000 acres of this forest land can be brought back by protecting it against fire and grazing, but the rest must be planted.

Federal Control of Land Favored in Report of Oregon Committee

Retention by the Federal Government of unreserved public lands, provided the Government will agree to place regulation of grazing privileges on such lands under the United States Forest Service, is favored in a report recently made public by the Governor of Oregon. The report was compiled by a subcommittee of an Oregon committee appointed by the governor to obtain a cross section of Oregon opinion on the proposal to turn over the surface rights of unreserved public lands to the western State.

Approximately 13,000,000 acres in Oregon would be affected by the proposed action, of which about 11,000,000 acres, chiefly grazing land, is in the southeastern quarter of the State.

The subcommittee which drafted the report is composed of R. G. Callvert, chairman; William Duby, Robert N. Stanfield, Olin Arnspiger, and W. B. Snyder.

The following are some of the recommendations of the subcommittee:

> That by reason of administrative machinery the Federal Government is best equipped to supervise and regulate the lands involved; that the Forest Service should be enlarged into a forage preservation and utilization bureau, and that the grazing lands should be attached to the forests and that the forest system of grazing permits be extended to these areas.
>
> That transfer to the States of barren Governmen lands should not be considered as recompense for loss to the State of taxable wealth through use by the Federal Government of natural resources of national forests, Indian reservations, national parks, and other reserved lands.
>
> That Oregon and other Western States should receive the equivalent of taxes on reserved Government land.
>
> That before lands are accepted by the States, certain areas should be withdrawn to protect watersheds and present and prospective reclamation.
>
> That sale by the State of the ceded lands should be opposed to prevent private landholding monopolies and their use should be restricted to leasing or grazing rights.
>
> That if subsurface rights are granted, States with petroleum resources would benefit at the expense of the general reclamation fund, of which Oregon is a beneficiary, and Oregon should have an adjusted compensation through adequate division of the proceeds of Government timber sales.
>
> That all Federal land matters should be consolidated under the Secretary of Agriculture.

Round Table Conference on Natural Resources Held by United States Chamber of Commerce

At its annual meeting in Washington, D. C., Apri 28 to May 2, the Chamber of Commerce of the United States held a round table conference on the subject, What's Ahead for Business in the Natural Resources Industries? Col. William B. Greeley, former Chief Forester of the United States, and now secretary and manager of the West Coast Lumbermen's Association, acted as chairman.

Colonel Greeley outlined the problems of the lumber industry. He said that the pioneering stage is past, that a new era of industrial efficiency is at hand, and that to-day a current adjustment of production to consumption is necessary. This can be achieved, he said, only through consolidation of the units comprising the industry, at least in the Pacific Northwest. The smaller units must go if the industry is to hold its own. Rationalized production and distribution are essential.

On the north Pacific coast there are 700 individual sawmills cutting 14,000,000,000 feet annually, a pro-

tion which is 25 per cent less than their installed
acity. There is 40 years' supply of stumpage
ind them. Under the rising pressure of increasing
enditures due to the construction of roads, schools,
., in the mill communities, a heavy burden of
ation is being imposed upon these mills, conse-
ntly they are being forced to convert stumpage
o cash as rapidly as possible. Many of the weaker
ts are being forced out of business in this process.
t only does the industry lose from continued over-
duction, which continues in bad years as well as
good, resulting in the bankruptcy of the smaller
rators and causing losses to all, but the public
also the loser, Colonel Greeley said. Unemploy-
nt and instability of employment result, in a region
ere the lumber industry furnishes 60 per cent of
pay roll. This leads to suffering in the communities
endent on the industry. The public loses further
ough the waste of this natural resource. Forty
fifty per cent of the raw material is lost in slash
s and mill waste attendant on the necessary waste-
utilization of only the best grades of timber.

Another public loss occurs, Colonel Greeley said,
ause the reforestation of cut-over lands is handi-
ped by the recurring periods of instability. Re-
estation under present conditions is too costly from
angles. The tendency is to leave such lands for
es, since until present uncertainties are removed
re is no justification for holding. All manufacturers
not agreed that the solution is along the line of
certed action; some believe in the idea of the
rvival of the fittest." But the general belief is that
olution through concerted action is possible.

Dr. Wilson Compton, of the National Lumber Manu-
turers' Association, outlined briefly the plan pro-
sed for joint action of the lumber and wood-using
erators representing the industry at large. Through
fact finding agency, said Doctor Compton, a solu-
n of the problem may be arrived at. The aim is to
eet the public interest and to help industry to func-
n in a permanent capacity as a producer and supplier
raw materials. The forest situation embraces major
oblems of timber, land, and labor, Doctor Compton
d. The overproduction problem is getting worse.
aos threatens—a waste of wood, premature cutting,
creasing land values, and other evils.

Public support is needed, he said, for the practice
commercial forestry. A national timber conserva-
n board should be established to study the problem,
find the facts, and make suitable recommendations.
should consist of all those interested in conservation.
e objectives of this board should be to declare the
ts and to recommend a policy concerning: (*a*)
hat are the important assets and liabilities of the
ustry and what do we lack? (*b*) What are the
sic economic causes of the prevailing conditions of
overproduction of forest products? (*c*) What remedies through Federal and State activity are needed to aid in industry?

The conference approved a motion that a committee composed of members of all the natural resources industries be formed to study and clarify their problems.

Porto Rico Needs More Forests, Says Kircher, After Inspection

Deforestation has progressed in Porto Rico until it is affecting seriously the economic welfare of the island, says J. C. Kircher, forester of the eastern national forest region, United States Department of Agriculture, who recently returned from a tour of inspection of the forest conditions in the island territory. Many steep slopes which have been put into agricultural crops should never have been deforested, reports Mr. Kircher. Erosion on these slopes has done much damage. The island has been suffering from lack of timber.

The Luquillo National Forest, consisting of 13,500 acres of Government land administered by the Department of Agriculture, contains the only virgin timber remaining on the island. It is probable that there will be no timber cutting in the next year or two, because there is a temporary oversupply of wood for charcoal, the results of the large supply of windfall from the recent hurricane. W. P. Kramer, the local forest supervisor is preparing a management plan for the forest, however, so that as soon as a supply of timber is needed, cutting may commence in an orderly fashion on a permanent basis.

Forest growth is rapid in Porto Rico, Mr. Kircher reports. Saw timber grows at the lower elevations in the Luquillo area in 20 to 30 years. Mangrove forests along the seacoast are handled by the insular government on a 7-year rotation to produce wood for charcoal. Mahogany, although not native to the island, will grow saw logs in from 30 to 40 years.

Originally the island was heavily timbered, but most of the timber has been cut. The remaining timber is largely in the national forest, in several insular forests, and on the coffee plantations, where forest trees are grown to shade the coffee. The main forestry needs of the island are summarized by Mr. Kircher as follows:

1. Reforestation of the high mountain slopes; approximately 220,000 acres above 2,000 feet elevation should be kept permanently in forest for watershed protection.

2. An increased planting program. The insular nurseries now produce about 1,000,000 trees for planting annually. These are distributed to farmers and other landowners or planted on the insular forests. The demand for trees for forest planting is much greater than the insular nurseries can supply, and production should be raised to 5,000,000 trees annually.

3. Establishment of a forest experiment station to carry on research in tropical forestry problems. Ultimately the Forest Service hopes to have an experiment station in Porto Rico, but at present no funds are available for this purpose.

Mr. Kircher reports that territorial officials and prominent citizens in Porto Rico are greatly interested in its forest problems and are convinced that forestry must play a large part in the rehabilitation of the island.

R. M. Evans, assistant regional forester, accompanied Mr. Kircher on the tour of inspection in Porto Rico.

Canary Pine a Tree of Commercial Possibilities in the United States

By Bernard Frank, United States Forest Service

Canary pine, or Canary Island pine (*Pinus canariensis*), a hardy native of the Canary Islands, is said to be the ideal tree for the warmer portions of the Temperate Zone.

It has been successfully introduced into the arid portions of South Africa, into Australia, New Zealand, Japan, Chile, Argentina, and Brazil.

The wood is of much strength and durability, making excellent lumber and ties. The tree also produces turpentine but hardly on a commercial scale, as its yield is only one-fourth to one-third that of maritime pine, although seven to eight times that of Monterey pine. Its maximum productivity occurs between the ages of 25 and 50 years.

Canary pine requires but little moisture, either in the air or in the soil. Reproduction requires no shade or nurse of any kind and withstands drought well in the first year. It can be planted in midsummer.

The tree makes fairly rapid growth. Stands planted in Chile average 74 feet in height and 17 inches in diameter in 20 years, and 90 feet in height and 20 inches in diameter in 25 years. Other data show that the average annual growth is 39 inches in height and 0.4 of an inch in diameter. Trees 20 years old average 65 feet in height and 8 inches in diameter breast high, although the range is from 60 to 90 feet in height and 8 to 12 inches in diameter at that age.

In introducing Canary pine, seeding by the broadcast or dibble method or with cones is recommended. Dibbling gives the best results. In broadcasting, the area should be plowed or harrowed before and after sowing.

If planting is resorted to, seedlings rather than transplants should be employed, because of the early development of the taproot. On this account open-root planting is inadvisable.

Planting may be close; a spacing of from 3.3 to 4.1 feet is recommended. In very dry soil the closer interval is preferable. For faster height growth planti in mixture with species of Eucalyptus is best.

Once the stand is established, natural reproducti is assured. The trees bear ample seed and possess high sprouting ability. Twenty-year-old trees be fertile seed, and that from older trees is 95 per ce sound.

There are many areas in the southwestern portion the United States in which this species could be expe mentally planted. The quality of the wood, the har ness of the tree, and its fairly rapid growth ra coupled with its ease of reproduction, make it distinct promising for cultivation.

Fire Warning Issued to Sky Riders

Col. Clarence M. Young, Assistant Secretary Aeronautics, of the Department of Commerce, h advised the Secretary of Agriculture that he has se a letter to all pilots of whom the department has r cord—some 9,000 in number—calling attention to provision in the Air Commerce Regulations again the dropping or releasing of any objects from a crafts, which would endanger life or damage propert This would include such things as lighted cigarettes cigars. Colonel Young has advised the pilots that t penalties which are provided for violations, will rigidly enforced. The Department of Commerce al sent a similar communication to the various air tran port organizations whether they are transporting pa sengers, mail, or merchandise.

Attention of pilots was called to this regulation the result of a letter written by Acting Secretary Agriculture, R. W. Dunlap, which called attention the hazard to which forests, grass lands, grain field and property, are exposed through lighted cigarett dropped from airplanes. The cooperation of t Department of Commerce in enforcing its regulati should prevent many forest fires and grass fires. Wit the increased use of airplanes, the fire danger woul become greater annually if some restrictions of th kind were not imposed.

The Scenic Airways Co. at the Grand Canyon had a their planes equipped with ash trays for each pa senger. This makes it convenient for the passengers t dispose of cigarette butts and matches.

A number of the air transport organizations hav posted suitable warning notices in the cabins of the aircraft, and a precaution of that character is provin effective as far as the passengers are concerned, M Young's letter stated. However, such a warnin should be provided, he said, by all air transport line and its observance should be exacted; also, and equal if not greater importance, the pilots of such line including mail as well as passenger, should be give specific instructions for their own observance in th matter of throwing out lighted cigars, cigarettes, etc.

uty of Landowner and Public in Forest Protection

A. B. Hastings, in Charge of State Cooperation, Federal Forest Service

Who is responsible for the protection of the forests
m fire? By whom shall this work be done? First
to responsibility. It is not difficult to prove that
ny of the benefits of protection of the forests come
the public and not to the private owner as such.
is is true in the case of the great beneficial effect
t fire prevention and control have upon the run-off
l storage of water, and upon the fixation of soil to
vent erosion. It is also true in the case of the
kingly improved conditions for the production of fish
l game, and in recreational advantages. The public
nefits directly through the stabilization of wood-using
ustries, through increased land values, and through
general economic development of the commu-
y and of the Nation, depending as it does in forest
ions upon the continual production of forest crops as
trasted with forest destruction which later in-
tably leads to the disastrous breaking up of com-
nities and industries when the lumber companies
ve "cut out" and must "move on." The public
nefits by forest-fire prevention and control and
refore has a large measure of responsibility. Fur-
rmore, the public is frequently responsible for fire
urrence. Of the 41,000 fires reported on protected
as in the United States in 1928, over 50 per cent
re attributed to agencies over which the individual
downer had little or no control.

t is not difficult to differentiate the benefits which
peculiarly national from those which are more
lusively State. Through the destruction of vegeta-
e cover by forest fire at the headwaters of the
ssissippi, the natural water storage functions of
se watersheds is impaired, the run-off is hastened,
l a serious flood situation in the whole Mississippi
sin is made more serious. Furthermore, soil—
od, bad, and indifferent—is carried from the States
rth to their loss, and deposited later in other States to
south, filling up stream channels and covering the
ttomlands. These are primarily interstate or na-
nal benefits.

In the increase of taxable values through the pre-
ntion and control of forest fires, the public, as repre-
nted by the State, benefits first. In this case,
wever, as also in the case of recreational improve-
nts and general economic development, both the
tion and the State receive substantial returns. The
tion has a very real interest in the adequate pro-
ction of wood materials of desirable quality and
antity wherever these wood materials are produced.
Each fire loss that occurs effects a definite reduction in the prosperity of the Nation. It is a positive disadvantage to many millions of people. Just as truly as that the impulse from the dropping of a single pebble in the ocean extends to the farthest bounds of that ocean, so the impulse from each single destructive fire attacks the economic and social well-being of the whole Nation.

The public, Nation, and State, is then responsible. So also, however, is the individual. To him come the most direct benefits from the protection of his forest lands from fire. In addition to sharing the general benefits which come to all, to him comes the gain from stimulated and sustained production of products which he himself can sell. Further, he is not blameless in the matter of fire occurrence. Nearly half the fires are caused by him. Is it not clear then that the Nation, the State, and the private owner have a community of responsibility?

In answering the question by whom shall the work be done, it is indeed fortunate that we have such abundant experience to serve as our guide. The method of depending upon everybody and especially upon the landowner himself to handle the forest fire situation has been diligently tried in this country from the earliest days and with what lack of success! Nor is it surprising that we are unable to depend upon the average citizen and the private landowner to handle this situation. He may have a real interest but not recognize that interest. Furthermore, he may know that his is not the responsibility for the fire occurrence and that others will benefit sometimes even more than he by fire control. Finally he knows that by himself he can not adequately handle the job. He has, however, a most important part to perform.

The prevention and control of forest fires can not be accomplished economically and effectively except by the joint efforts of public and private agencies. Group action is essential to success. Each effective protective working unit will, generally speaking, embrace not single but several ownerships. The planning and direction of the work very clearly can be best handled by the public, the State.

Fires must be prevented by education, state-wide and nation-wide, surely a public function. They must be promptly located, when they occur, by adequate detection and communication machinery. This can be reasonably cheap only when the cost can be allocated against each acre of a logical protective unit, when in the case of a lookout tower, every acre which comes within view is equally served without reference to ownership. This means group protection such as by associations of private owners organized and operated under State leadership. Culprits must be apprehended—

a function of the State. Fires must be fought promptly and without reference to property lines, under efficient leadership by men who know how, who are organized in advance and effectively equipped. This also demands group action if it is to be effective and economical. It is specialized work, quite as truly, perhaps, as is the work of the city fire department. A skeleton organization must be constantly on call during seasons of fire occurrence, ready for instant action and for rapid expansion.

It is then only through organized and united effort that forest fires can be prevented and controlled. While it is clear that the public must take the leadership and responsibility, real success in protecting our forests from fire can only be attained when the owner of forest land forms an integral part of the organization, overcoming all hazards which he himself creates, supplying council, money, and labor to perfect and put into operation adequate state-wide programs.

On March 1, 1911, the first step was taken by the Federal Government, through the enactment of the Weeks law, in recognition of joint responsibility between the Nation and the States in the protection of State and private forests from fire. West Virginia and Kentucky were the first of the Southern States to qualify for cooperation under this law, which they did in 1913. These States were joined in 1915 by Virginia and North Carolina, in 1916 by Texas, in 1918 by Louisiana, in 1921 by Tennessee, in 1924 by Alabama, in 1926 by Georgia, Mississippi, Oklahoma, and in 1928 by Florida and South Carolina. With the single exception of Arkansas, the States of the South are now all in the cooperative family.

On June 7, 1924, a second and most significant step was taken by the Clarke-McNary law. Prior to the passage of this law a select committee of the United States Senate toured the country with hearings in each forest region to determine, if possible, the best means for the prevention and control of forest fires and of stimulating reforestation on State and private lands. This law constitutes a great cooperative venture.

Section 1 of this act provides for recommendation by the Secretary of Agriculture of systems for adequate protection by regions in cooperation with appropriate State agencies.

Section 2 of the Clarke-McNary law provides for Federal cooperation with the States in the protection of timbered and forest-producing lands from fire, sharing in the cost of the work. It is based upon the principle that the Federal Government, the States, and the owners of private land in the country should unite upon an effective program of adequate protection of our forest lands. Recognition for Federal reimbursement of private expenditures under State supervision is given by the Clarke-McNary law for the first time. This law also provides for Federal participation in the protection of other areas than those on the watersheds of navigable streams, a broadening of the Weeks law provisions.

The $2,500,000 authorization for Federal approp tion under the Clarke-McNary law each year forest fire cooperation was based upon the assumpt that we are confronted with a $10,000,000 job, 50 cent of the financial burden of which would be bo by the private owner, 25 per cent by the States, 25 per cent by the Federal Government. This co erative work is carried on under policies laid dowr a cooperative program signed by the Secretary Agriculture and was developed after much consul tion with the States. It provides for a state-w conduct of the protection work by the State fores upon the basis of plans and estimates submitted the Federal Government. The responsibility for conduct of the work is placed squarely upon States. The Forest Service participates in the mak of plans, inspects the projects to make certain t the terms of the cooperative program are being co plied with and that the Federal funds are well vested, and through friendly consultation and adv endeavors to give to the individual State the vantage of the experience of other States and of United States Forest Service. The Forest Service, course, checks the States' accounts and certifies to reimbursements which are made to these States af the expenditures are incurred. The State program directed by State officers. The woods are patroll fires are detected, reported, attacked, and suppres by the State forestry departments, generally work in cooperation with county or other local politi units and private owners who contribute to the w voluntarily or as provided by law.

As indicated above, the cooperative plan for fore fire prevention and control involves a definite shari of the financial burden by the Federal Governme the State, and the private owner. It presumes conduct of the work ultimately on a well-round state-wide basis.

Sweet Gum or Storax (Styrax) in Demar

The gum which exudes from wounds in red or sw gum (*Liquidambar styraciflua*) is again receiving c siderable attention, according to the Forest Produ Laboratory of the United States Department of Ag culture. This little-exploited forest product is used a variety of purposes, for it contains cinnamic ac has a pleasant odor, and is an ingredient of pharn ceuticals and of chewing gum. One company now seeking 13,000 to 15,000 pounds annually with t promise of an increasing demand. This company advertised its demands widely and has issued a letter instructions for collection of the gum based on t article by Mahood and Gerry published in the Drugg Circular in January, 1921, with modifications recent suggested by Doctor Gerry. The company is n asking the cooperation of the State foresters and t American Forestry Association educational workers making their needs known.

orest Fire Weather Data for the Hardwood—Spruce Forest Type

By **Paul W. Stickel**, Northeastern Forest Experiment Station

There is a high correlation between weather condins and forest-fire hazard. This is borne out by a eliminary analysis of the data obtained by a forest- weather study carried on jointly by the New York ate College of Forestry, Syracuse, N. Y., and the rtheastern Forest Experiment Station. The consions are based on a 5-year investigation at the arles Lathrop Pack Demonstration Forest, Cranry Lake, N. Y., in the hardwood-spruce forest type. The moisture content of the "duff" or top layer of heavy litter found on the ground in the forest was ed as the indicator of fire hazard. By making ual inflammability tests under various degrees of duff moisture content with the fire brands listed below, six zones of inflammability are recognized as follows:

Degree of hazard and duff moisture content	Dangerous firebrands
Extreme, below 6 per cent	Cigarettes, locomotive sparks, pipe heels, matches, and camp fires.
High, 6 to 10 per cent	Locomotive sparks, pipe heels, matches, and camp fires.
Medium, 11 to 16 per cent	Pipe heels, matches, and camp fires.
Low, 17 to 22 per cent	Matches and camp fires.
Very low, 23 to 29 per cent	Duff at edges of camp fires will smolder but not spread much.
Generally safe, 30 per cent and above.	None; generally safe from all.

The relations between the more important weather factors and the inflammability zones of duff in the open and in the forest are illustrated in the following two tables:

LEGEND

T. =Air temperature, ° F.
T. =Top duff temperature, ° F.
V. =Evaporation per hour, cubic contimeters.
H. =Relative humidity, per cent.
P. =Depression of dew point, ° F.
Hr. =Hours since last trace of rain.
M. =Hours since last measurable rainfall.

IN THE OPEN

Degree of hazard	A. T.	D. T.	E. V.	R. H.	P.	Hr.	M.
erally safe	Below 68	Below 74	0- 1.2	100- 59	0- 13	0- 18	0- 34
htly dangerous	68- 74	74- 82	1.3- 1.7	58- 45	14- 20	19- 35	35- 62
derately dangerous	75- 78	83- 91	1.8- 2.1	44- 34	21- 27		
ngerous	79- 82	92- 102	2.2- 2.6	33- 23	28- 39	36- 77	63- 122
hly dangerous	83- 85	103- 120	2.7- 3.4	22- 15	40+		
remely dangerous	86+	121+	3.5+	14-	.....	78+	123+

IN THE FOREST

Degree of hazard	A. T.	D. T.	E. V.	R. H.	P.	Hr.	M.
erally safe	Below 84	Below 99	0- 2.1	100- 28	0- 30	0- 89	0- 200
htly dangerous	84- 87	99- 111	2.1- 2.4	27- 19	31- 41	90+	201- 264
derately dangerous	88+	112+	2.5- 2.8	18-	42+		
ngerous	...	...	2.9- 3.4	...	...		265+
hly dangerous	...	...	3.5+	...	...	...	...
remely dangerous	...	...	...	...	...	...	...

In using the above data to estimate fire hazard it is ggested that 2 p. m. meteorological observations be ed, and that the various factors be used in conjuncn with one another. In general, 2 p. m. meteoroical observations are of greatest value, since at that ne daily maximums and minimums are usually ured. In making an estimation of the probable zard the first step should be to use the hours since ce or hours since last measurable rainfall factors. en the current psychrometric determinations should applied to such factors as air temperature, relative midity, and depression of dew point. It is believed at these data are applicable to the hardwood-spruce est type throughout northeastern United States d eastern Canada.

Eastern White Pine in Montana

With the aid of a Michigan forester white-pine seedlings (*Pinus strobus*) were shipped in and planted at Sylvanite, Mont., in 1909. The old town of Sylvanite has disappeared and is almost forgotten, but the pines live on and are holding their ground. Apparently twelve hundred 4-year-old *P. strobus* were planted over an area of 3.7 acres. In 1919, 61 per cent of the stand was alive. These records compare favorably with the survival records of western white pine. Many of the trees are now 30 to 35 feet in height and one measured 5½ inches at breast height. The eastern white pines have made double the growth of the native white pines of about the same age intermingled with them.

Annual Meeting of National Committee on Wood Utilization

The National Committee on Wood Utilization of the Department of Commerce held its annual meeting on May 2 at the Department of Commerce Building, Washington, D. C. The Secretary of Commerce, who is the committee's chairman, delivered the opening address. R. Y. Stuart, United States Forester and vice chairman of the committee, presided. The committee is composed of 200 members, representing more than 80 trade associations interested in intelligent utilization of wood. Addresses on building and construction problems were features of the meeting, as was also a discussion of the Scandinavian gang-sawing system introduced into the United States and successfully tested on the Pacific coast by the committee (FOREST WORKER, January, p. 27), and particularly the possibility of extending the use of this system to other parts of the country. Other projects of the committee brought up for consideration were the stocking of chemically treated wood by retail lumber yards; fireproofing, hardening, softening, and other wood-treating processes; and the promotion of the use in the manufacturing field of small dimension stock—that is, stock cut to sizes which can be used by industry with a minimum of manufacture.

Major Stuart spoke of the close connection between utilization of forest products and the practice of good forestry, and of the encouragement given by the Wood Utilization Committee to the profitable use of forest crops. He also emphasized the fact that while the committee's work centers in the wise and effective utilization of wood products its influence for good radiates to the forest resource itself, since forest conservation is complementary to wood conservation. He explained the difference between them as that of complete utilization in wood conservation compared with methods of forest utilization which assure perpetuation of the forest crop and are lastingly beneficial to grower, producer, and consumer alike. At the same time he made plain the mutuality of interest between wood utilization and forest utilization, and the need for recognition of this relation and of cooperative effort to further it.

Various activities of the committee which were reported as having gained headway include—

1. Lumber stresses: Under the chairmanship of F. O. Dufour, of Philadelphia, the preliminary work of establishing a subcommittee on lumber stresses is now being carried out. This subcommittee, which will be fully organized during the summer, will be composed of experts in the engineering and architectural field.

2. How to judge a house: Under the direction of a subcommittee of which N. Max Dunning, Chicago architect, is chairman, a bulletin on this subject is now being prepared. The object of this bulletin, which w be appropriately illustrated, is to answer the questio concerning construction and design which arise in t mind of the individual who is considering the purcha or building of a home. The bulletin will be prepar during the summer, and will be released someti during the present year.

3. Furniture booklet: In cooperation with the N tional Association of Furniture Manufacturers and t National Retail Furniture Dealers Association, the co mittee is developing a project involving the educati of consumers to a better appreciation of furniture co struction and design. This summer a handbook on t subject will be prepared. The committee's interest this work lies in putting wood for furniture to its mo efficient use, and applying proper design and constru tion to furniture.

4. Insulation of buildings: A project which has f its object an educational campaign among home owne and builders in regard to the proper methods of ins lating dwellings will soon be started. The question sound deadening and accoustics will necessarily form part of this project. A brief treatise on these subje written in a popular vein, will be prepared.

5. Booklet on wood construction in the Tropic Under the chairmanship of I. W. McConnell, a sub committee is now being organized for the purpose producing a handbook on wood construction in tropic countries. This book will be of particular interest sections of the United States and its possessions whe climatic and other conditions make the use of woo difficult. A field survey is now being undertaken by th committee in order to bring together all available fact The bulletin will be prepared during the latter part the present year.

6. Airplane hangar test: Cooperating with the N tional Lumber Manufacturers Association, the com mittee placed at the disposal of the Fact Finding Com mittee for Aeronautics an airplane hangar of woo construction erected on the Bureau of Standards lot, i Washington, D. C. This hangar was provided wit automatic sprinklers, and a test covering the fire ris was made during the latter part of April. Based on th result of this test, the committee will develop a bullet on wooden airplane hangar construction.

7. Industrial uses of American woods: A difficult confronts industrial wood users in determining th proper wood to be used for each specific purpos Realizing this, the committee is laying the foundatio for a handbook on the subject. This project wi require about two years for completion, and will b based largely on the result of official tests and actua present uses. It will be handled mostly through ques tionnaires. The principal wood-using industries ar cooperating with the committee in the preparation o this handbook.

ird Annual Planting of Cut-Over Land Made by Lumber Company

ursuing its policy of investigating the possibilities eforestation, the Booth-Kelly Lumber Co. has just pleted its third annual experimental planting of -over land in Oregon with several of the most promg tree species. The first planting, three years ago, of 10,000 plants of redwood and western yellow e. Apparent success in adapting the latter to tern Cascade conditions led to a much larger nting in 1929, with the addition of Port Orford cedar red cedar in order that the growth rates of these cies might be compared with those of Douglas fir other native species. Record is kept of planting hods, costs, and success, to determine the relative antages of different introduced species to supplent natural reforestation in a practical commercial .

his year 12,000 pondosa pine, 2,000 Port Orford ar, 2,000 ash and 500 mulberry have been added to vious plantings of these species and the experiment her expanded by several thousand Scotch pines, nese elms, and larch. The stock was supplied by cooperative forest school at Corvallis. Planting directed by Norman G. Jacobson, of the Western estry and Conservation Association.

ew Jersey Plant Uses Wood Shavings as Raw Material

fforts of the National Committee on Wood Utilizan to put wood waste to definite uses have resulted in utilization of wood shavings by an important manuturing concern in New Jersey. This company uses m 300 to 500 carloads of shavings yearly. While ite pine shavings are preferred, any clear softwood hardwood shaving that is free from foreign matter l of light color—such as yellow poplar, spruce, bassod, cottonwood, aspen, etc.—can be used.

Axel H. Oxholm, director of the National Committee on Wood Utilization, says that the committee is constantly receiving requests from industries in a position to use material which to the woodworking plant and sawmill is mere "waste." The committee's surveys of nonutilized wood in Virginia and North Carolina showed that in Virginia 28,000 carloads and in North Carolina 33,000 carloads of wood waste are now available as raw material for pulp mills, fiber factories, box plants, and similar industries.

* * *

The larch canker which was discovered in 1927 in Massachusetts on some trees about 20 years old which had been grown from seedlings imported from Europe, has now been brought under control, according to Dr. Perley Spaulding of the Bureau of Plant Industry. Larch canker attacks larch, Douglas fir, and western yellow pine and caused considerable worry about a year ago, lest it spread from New England to the west, but Doctor Spaulding reports that it is now cleared up without any danger of spreading to the West.

Conservation Commission Authorized by Congress

A bill authorizing the President to appoint a commission to study and report on conservation and administration of the public domain became law on April 10.

* * *

Studies at the Northeastern Forest Experiment Station have shown that the small twigs on softwood timber decay much more slowly than do the large limbs. These studies showed also that the hardwood limbs decay very fast compared with the softwood, consequently hardwood is neither piled nor burned, but the softwood brush is being both piled and burned to make reproduction easier.

Foreign Notes

000,000 New Zealand Pines Go to South Africa

A South African company has been organized to ance the planting of over 4,000,000 New Zealand ite pines on 4,000 acres of land about 6 miles from Pretoria, South Africa, because of the steadily increasing demand for forest products, such as timber for the manufacture of box shooks to be used by South African fruit exporters. According to the Lumber Trade Journal, large quantities of shooks are at the present time imported from north European sources.

Chile Still Has Large Native Timber Supplies

Although Chile is importing Douglas fir and other woods from the United States, it has extensive forests supporting an important lumber industry, according to advices from Assistant Commercial Attaché Robert G. Glover, at Santiago.

The Chilean mills supply the greater part of the demand in the northern half of the country and also export furniture wood to Argentina and ties to Peru. The nitrate region of the north depends largely on Douglas fir, and this wood has filled out the deficiency in native lumber in the south during the building boom of the past year. About 70 per cent of the importations of Douglas fir is for the account of the large American mining companies operating in the north of Chile.

Chile has hardwoods suitable for general construction, interior finish, furniture, and ties. Of other species, cedar, cypress, and a wood similar to our southern yellow pine are the most important. Several of these species are durable.

Chile is almost 3,000 miles in length from north to south, and since most of the lumber is in the southern part of the country freight rates form a large part of the costs. There are relatively few large and segregated stands of timber that would justify the expense of installing a large mill; consequently, most of the lumber is manufactured by portable-type mills. What is now the principal lumbering section was only a few years ago the southern frontier of the rich agricultural belt of Chile. Probably 75 per cent of the lumber is cut on the farms.

40,000 Acres to be Planted to Forests in Rhodesia

The Government of Southern Rhodesia has adopted plans for planting about 40,000 acres of softwoods. At the present time practically all the softwoods used in construction work in Rhodesia, South Africa, have to be imported.

As a first step the Government acquired in 1927 an area of 18,420 acres of uncultivated land situated on the highlands of Rhodesia's eastern border. The tract lies about 30 miles north of Untali and the location is well suited to afforestation. In 1929 this area was increased to nearly 60,000 acres by the purchase of additional land which contains a limited stand of indigenous timber that is now being surveyed. Early in 1928, during the rainy season, 690 acres of the original tract was planted with conifers, and in the rainy season of 1929–30 plans called for the planting of about 1,000 additional acres of softwood trees.

The governmental forestry service is also tak means to determine which of the species that h developed under natural conditions are the most har The conifers planted on the original tract have sho remarkable growth, and several varieties of softwo which will grow rapidly are being developed in th highlands.

Australian Forester Visits Alabama

A. D. Lindsay, a research official of the Australi Federal Forestry Bureau, arrived at Montgome May 2 to spend some time in the State inspecting t work of the Alabama Commission of Forestry, wi particular reference to the growing of southern pin On the first day of his visit Lindsay viewed a consid able part of the State from the air in the plane assign to the commission of forestry. He will visit the Sta forest nursery during the period of his stay.

The Australian Forestry Bureau is considering t introduction of southern pines into the island con nent, Mr. Lindsey says. There is an abundance valuable hardwoods in Australia, but softwoods are great demand. Experiments are being made to d termine which species of pines will be most adaptab to the needs and growing conditions in that country

Forest Economist from India Tourin United States

India is rapidly advancing toward a full realizati of the value of timber preservation and wood utiliz tion, according to Sonti Kamesam, forest economist the Forest Research Institute of Dehra Dun.

Mr. Kamesam is on a 2-year tour which is to take hi through the United States, Canada, and Europe. H prime interest is timber utilization and wood prese vation.

India has great forests, government-owned, and the are well preserved, Mr. Kamesam said, during a recen visit to the headquarters of the Southern Pine Associ tion. Selective cutting and reforestation are not new having been practiced in India for many years. Ther are 40,000 miles of railways in India that are usin wood for ties. There will be need for more and mor lumber along these lines, and one of the purposes, M Kamesam said, of this research trip is to study method used in America and Europe in treating lumber to pro long life. Mr. Kamesam hopes that upon his retur to India he will be able to persuade Government official to utilize more timber in railway and telegraph sys tems and harbor construction.

India's vast forest resources present a field for th introduction of woodworking plants. During this tri Mr. Kamesam is making a study of sash-and-doo factories, toy factories, and other woodworking mills

at upon his return to India he may get such enter-
es started as one step toward the wood-utilization
ram on which he is working.

he Forest Research Institute, of which Mr. Kame-
is a member, is a Government institution. Mr.
esam, as its forest economist, is probably the best
ed authority in wood preservation in his native
. The various data he is compiling while on this
will form the nucleus for a book which the Govern-
t has instructed him to write on the subject of
d preservation and wood utilization.

Blister Rust Has Reached Nova Scotia

White pine blister rust has found its way into Nova Scotia, says a report to the Bureau of Plant Industry. Until recently the rust was seen on currant bushes only, but two or three infected young pines have now been discovered. It is expected that the rust will be placed under control observation by establishing various plots suitably located for annual study. Eventually, areas in which currants and gooseberries have been eradicated may be put to the growing of white pine.

Personals

Nelson Ferris MacDuff

elson F. MacDuff, forest supervisor of the Cascade
ional Forest, Oreg., since 1919, met a tragic and
mely death on April 4, 1930. He was found dead
a pistol shot early next morning in a grove of
ng Douglas firs along the forest trail he was ac-
omed to travel. The manner of his death is
nown.

elson F. MacDuff was born in Ohio on July 2, 1883,
was reared in Michigan. Long before he had left
school he had chosen forestry as his life's work.
graduated in forestry at the University of Michigan
1907 with high honors and election to Sigma Xi.
passed the forest assistant's examination and went
t as forest assistant on the Siskiyou National
est, Oreg. He was promoted to assistant supervisor
he Siuslaw Forest in 1910 and became forest super-
r of the Cascade Forest in 1919.

n his 11 years of administration and protection of
important timber forest he was responsible for the
elopment of its fire detection and communication
tems, for the building of many roads and trails, and
the consummation of a large timber sale by which
ig body of overmature Douglas fir was utilized.

* * *

Regional Forester E. W. Tinker, of the Lake States
ion, announces the transfer of Forest Supervisor
G. Hamel, for three and one-half years supervisor
the Superior National Forest, to the regional office
Milwaukee, where he will take over the work
merly handled by Regional Forest Inspector C. A.
ar, in cooperation with the States in fire protection. Mr. Hoar will be assigned as assistant regional forester in charge of fire protection, improvements, and land uses within the national forests of the Lakes States region. S. D. Anderson, at present supervisor of the national forest purchase units in Wisconsin, will be transferred to the Superior National Forest to succeed Mr. Hamel, and R. U. Harmon, at present assistant supervisor on the Superior National Forest in Minnesota, will be transferred from that forest to take charge of the national forest purchase units in Wisconsin. Mr. Harmon has had long experience in connection with the administration of national forests, and particularly fire protection and suppression work, as well as planting work done within the Superior National Forest.

R. C. Brown, of the gipsy-moth laboratory, Bureau of Entomology, United States Department of Agriculture, sailed from New York to return to his temporary headquarters in Budapest, Hungary. Before reaching Budapest he will visit Sweden in search of information regarding parasites of a sawfly, *Phyllotoma nemorata* Fall, which has recently attracted considerable attention as a leaf miner of birch in Maine, New Hampshire, Nova Scotia, and New Brunswick.

Walt L. Dutton, formerly forest supervisor of the Malheur National Forest, Oreg., has been promoted by transfer to fill the position of assistant in range management in the regional forester's office at Portland, Oreg., made vacant by the promotion of F. V. Horton to assistant regional forester. Mr. Dutton's place on the Malheur Forest has been filled by promotion to forest supervisor of Carl M. Ewing, former assistant supervisor. These two changes took effect on May 1.

Charles J. Kraebel, of the California Forest Experiment Station in Devil Canyon, and H. H. Hunt, of the San Bernardino Forest office, recently, under the auspices of the Kiwanis Club, gave vocational talks on forestry to a large number of San Bernardino highschool boys who have chosen forestry as their profession.

At the request of the War Department, Dr. T. E. Snyder, of the Bureau of Entomology, recently left Washington to inspect, with a representative of the Forest Products Laboratory, military supplies of wood at arsenals in Rock Island, Ill., New Cumberland, Pa., and Springfield, Mass. These inspections are m periodically, to prevent serious damage by pow post beetles.

T. E. Shaw, formerly in charge of blister-rust c trol in Pennsylvania, has been appointed extens forester for the State of Indiana. His headquart will be Purdue University, Lafayette, Ind.

George W. Peavy, dean of the school of forest Oregon State College, who was injured in an autor bile accident early in April, will not be able to te for the rest of the school year.

Bibliography

Forest Service Reports Practices Necessary For Timber Crop Production in Northeast

Full protection from fire, reforestation of denuded areas, and improved cutting practices are the minimum requirements necessary for successful timber growing in the Northeastern States.

In the attempt to meet the demand for the information of practical ways and means of growing timber profitably, the Forest Service is presenting the results of experience and investigation in timber growing and logging practice in the New England States, New York, New Jersey, and Pennsylvania. This investigation is one of a series of "minimum requirements" studies which the Forest Service has been carrying on dealing with the requirements for successful timber growing in the 12 principal forest regions of the United States.

The Northeast is the most densely populated and at the same time one of the most extensively forested regions in the United States. It has five distinct forest types, each of which consists of a characteristic combination of species.

The real forest problem of this section is one of building up large areas of run-down forests, says the Forest Service. Even where fire has been kept out, cutting and subsequent neglect have rather generally resulted in a progressive deterioration which is evidenced by poorly stocked stands and increased representation of the less desirable species. To-day comparatively little forest land in the region is producing the yield of which it is capable.

Fire control is nearly the only requirement that is absolutely necessary to keep most land already forested at least partially productive, the Forest Serv finds. Essential features of adequate fire control clude centralization and organization of control tivities, maintenance of prompt detection agencies, suppression organization that can quickly get a pr erly equipped crew to every fire, and penalties carelessness with fire in any form.

Planting is declared necessary to restore forest p ductivity on lands which have been so severely burn as to prevent natural reproduction, on occasion unburned cutover areas which have not reproduc naturally, and on abandoned farm lands which not reverting to forest.

The next step beyond keeping the land producti through protection and reforestation is to handle forest properly so as to obtain a regular income fr it. This necessitates such measures as improveme cuttings, regulation of grazing, and harvesting in su a way as to insure perpetuation of the stand.

The production of full timber crops often requir an outlay that could be avoided by letting nature ta its course; but this outlay is reasonably sure to repaid manyfold by the increased value of the fin product, the Forest Service's studies indicate. This particularly true in the Northeast, where favorab climate and soil conditions, desirable trees, and exce lent markets combine to make timber growing a profi able business.

Technical Bulletin No. 166, Timber Growing a Logging Practice in the Northeast, issued by t United States Department of Agriculture, gives t detailed results of the Northeast study. Copies ma be had, free of charge while the supply lasts, by writi to the United States Department of Agricultur Washington, D. C.

Agriculture Yearbook Includes 18 Forestry Articles

he United States Department of Agriculture's t Yearbook of Agriculture is dated 1930 instead of . There is no Yearbook bearing the date 1929. change in the method of dating is made to conform the practice commonly followed in the publication earbooks, whereby such volumes are designated by year in which they are printed rather than by the surveyed. The present volume surveys agricul- l conditions in 1929.

ke the yearbooks issued for the three preceding s, this volume features numerous short articles re- ing recent developments in agricultural science and tice. It offers up-to-date information on most of he important phases of agriculture. Forest Service ialists contributed the following articles:

Ranges Made Usable by Hauling Water for Live- k, by Douglas C. Ingram, associate range exam- .

Lumber for Farm Buildings Should Be Well Sea- d, by Rolf Thelen, engineer in timber physics, st Products Laboratory.

Forest-Grown Evergreens Can Be Transplanted roper Care Is Taken, by G. A. Pearson, director, thwestern Forest Experiment Station.

Christmas Trees a Profitable Farm Crop in Some alities, by F. H. Eyre, associate silviculturist.

Christmas Tree Demand Is Means of Improving e National Forest, by E. S. Keithley, supervisor, e National Forest.

. Range-Forage Grazing Should Leave Fifth or re of Plant Volume, by Ernest Winkler, assistant onal forester, Intermountain District.

. Farmers Numerous in Throng of Motorists That mp in Forests, by F. R. Johnson, technical assistant.

. Timber and Cattle Can Be Raised Together on thern Cutover Land, by L. J. Pessin, associate st ecologist.

. Big Game Increase in Southwest Forests Calls for ntrol Measures, by D. A. Shoemaker, range exam- r.

0. Forest-Fire Fighters Use Big Machines in Cur- g Control Roads, by Wallace Hutchinson, assistant onal forester, California District.

1. Snag Felling by Dynamite Cheaper Than by ving, by F. V. Horton, supervisor, Columbia Na- al Forest.

2. Range Stocking Must Be Conservative to Allow Poor Years, by Matt J. Culley, director, Santa Rita nge Reserve.

3. Forest Land Exchange Policy Is to Protect Tim- and Watershed, by John W. Spencer, administra- e assistant.

4. Forest Planting an Economic Need in Northern kes Area, by W. F. Ramsdell, assistant regional for- er, Lake States Region.

5. Woodlands Well Managed Bring in More Cash, Bernard Frank, junior forester.

6. Forestry Cause is Helped by Northwest Cham- s of Commerce, by John D. Guthrie, assistant ional forester, North Pacific Region.

17. Timber Waste Large in the Northwestern Doug- Fir Forests, by A. H. Hodgson, forest examiner.

18. Forestation Averts Erosion on Abandoned Mountain Farm Land, by C. R. Hursh, associate forest ecologist.

The Yearbook is for sale by the Superintendent of Documents at $1.50 the copy.

Growing Spruce and Fir Pulpwood Made Profitable

Spruce and fir, the pulpwoods of the Northeast, are increasingly in demand for paper making, and conditions for the production of continuous forest or woodland "crops" are particularly favorable in the spruce and fir region of the Northeast. The most important consideration upon which the pulpwood producer must base whatever form of forest management he practices is the presence or absence of sufficient young growth of spruce and fir in the stand before the mature wood crop is cut. It is from this advance growth that the new pulpwood crop must be matured. "Seeding in" after cutting seldom if ever produces satisfactory stands of pulpwoods, even were the delay in growth of no account.

Leaflet No. 57 of the United States Department of Agriculture, Pulpwood Crops in the Northeast, by M. Westveld, silviculturist, Northeastern Forest Experiment Station, Branch of Research, Forest Service, just issued, contains general conclusions regarding management of pulpwood stands arrived at as the result of intensive studies of a large number of stands and briefly applies these conclusions to the various types of forest in the Northeast.

Booklet Tells of Eli Whitney Forest

The Yale University School of Forestry has recently published a bulletin dealing with the Eli Whitney Forest. The volume is entitled "Eli Whitney Forest; A Demonstration of Forestry Practice," by Ralph C. Hawley and William Maughan.

The bulletin consists of 46 pages of reading matter and about 50 pages of illustrations. Three colored maps of the area are also included. The Eli Whitney Forest is representative of the oak region of Connecticut, New Jersey, and southeastern New York. The property is owned by the New Haven Water Co., a private corporation supplying water to the city of New Haven, Conn., and to the surrounding territory. This company, since 1900, has applied forestry practices to these lands in cooperation with the Yale School of Forestry. The bulletin describes the various forest types found in this locality and discusses the management policy adopted for this area.

Knowledge of Timber Values Necessary to the Woods Farmer

A revision of United States Department of Agriculture Farmers' Bulletin No. 1210 has been issued by the department. This bulletin gives useful information on the measuring and marketing of farm timber, prepared by Wilbur R. Mattoon, extension forester, and William B. Barrows, formerly forest examiner. Copies may be obtained from the department as long as the supply lasts.

South Seen as Important Source of Pulpwood

According to a publication entitled "South as a Source of Wood Pulp," issued by the Georgia Forest Service, the greatest potential source of pulpwood for paper manufacturing in this country is in the pine belt of the South. Government data on rate of growth are cited to show that southern pine grows seven to ten times faster than red spruce, now generally used for paper manufacture.

It is shown that paper manufacturers are beginning to realize the value of the pine belt as a source of supply. In 1921 there were 26 pulp industries in 9 States with an output of 382,500 tons annually, whereas in 1929 there were 36 establishments with a capacity for 1,000,000 tons. A rapid and large increase is anticipated because of the actual and potential supply of both pine and hardwood.

Leaflet 8: South a Source of Wood Pulp, By C. A. Whittle, Georgia Forest Service.

British Manual on Timber

The British Engineering Standards Association has just issued a publication entitled "Methods of Testing Small, Clear Specimens of Timber," and designated No. 373–1929, the Bureau of Standards states. The purpose of the pamphlet is to compare the mechanical properties of one species of timber with those of another.

* * *

Northern Rocky Mountain Trees and Shrubs by Joseph E. Kirkwood, late professor of botany at the University of Montana, is a book of some 350 pages suited to the use of rangers and others of little or no botanical training who wish to know their trees and shrubs. The test is illustrated by 87 pen-and-ink figures and 35 plates. The pictures alone are in many cases sufficiently clear and detailed to identify the plant for the person not inclined to study the keys and descriptions. This book is as well adapted to Idaho as to eastern Montana forests. It is understood that the edition is limited to 1,000 copies, priced at $7.50.

* * *

The United States Department of Agriculture Forest Products Laboratory distributed during March mimeographed reports of studies by F. L. Browne, senior chemist, on Properties of Wood that Determine the Service Given by Exterior Paint Coatings, and on
Effect of Priming-Coat Reduction and Special Prim
Upon Paint Service on Different Woods.

* * *

A revision of United States Department of Agric
ture Bulletin No. 863, Forestry Lessons on Ho
Woodlands, has been issued. This bulletin was p
pared by Wilbur R. Mattoon, extension forester, For
Service, and Erwin H. Shinn, in charge, agricultu
instruction, Extension Service. Copies may be
tained free from the department as long as the sup
lasts.

Recent Books and Pamphlets

Aikman, John M.: Distribution and structure of
forests of eastern Nebraska. 75 pp. illus., ma
Lincoln, Nebr., 1927. (University of Nebras
studies vol. 26, nos. 1–2.)

Alsace-Lorraine—Direction generale des eaux et fore
Statistique des forets d'Alsace et de Lorraine. 66
tables. Strasbourg, 1929. (Brochure no. 44.)

British Columbia—Dept. of lands—Forest bran
Report for the year ended Dec. 31, 1929. 48
pl., diagrs. Victoria, 1930.

Busgen, Moritz: The structure and life of forest tre
3d rev. & enl. ed. by Dr. E. Munch: English tra
lation by Thomas Thomson. 436 pp. illus.,
New York, J. Wiley & Sons, inc., 1929.

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California redwood in structural grades . . . effect
Jan. 15, 1930, with safe working stresses approv
by U. S. Forest products laboratory, Madison, Wi
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Form-class volume tables for balsam fir, jack pi
lodgepole pine, red pine, white pine, and bla
white, and red spruce. 200 pp. Ottawa, 1930.

Chalk, L.: The formation of spring and summer wo
in ash and Douglas fir. 48 pp. pl., diagrs. Oxfo
1930. (Oxford university—School of forestry. C
ford forestry memoirs no. 10.)

Clements, Frederic E. & others: Plant competitic
an analysis of community functions. 340
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of Washington. Publication no. 398.)

Cope, Joshua A., & Davis, J. E.: Log scaling and timb
estimating: forestry for 4-H club boys and gir
28 pp. illus., diagrs. Ithaca, N. Y., 1929. (C
nell university-N. Y. state college of agricultu
Cornell junior extension bulletin no. 39.)

Deutsche dendrologische gesellschaft. Mitteilunge
no. 41. 480 pp. illus., pl. Wendisch-Wilmersd
bei Thyrow, 1929.

Finland—Forstvetenskapliga forskningsanstalt: Me
delanden 13. 611 pp. illus., pl. maps, diagrs. H
sinki, 1929.

ance—Ecole nationale des eaux et forets: Annales, tome 3, fascicule 1. 189 pp. pl., maps. Nancy, 1929.

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eat Britain—Forestry commission: British yield tables. 23 pp. diagrs. London, 1930.

bert, Ernest E.: A study of laboratory methods used in testing the relative resistance of wood to decay. 47 pp. illus., diagrs., tables. Moscow, Id., 1929. (Univ. of Idaho—School of forestry. Bulletin no. 3.)

dia—Andaman Islands—Forest dept.: Report on forest administration for the year 1927–28. 88 pp. Calcutta, 1929.

dia—Madras—Forest dept.: Administration report of the forest dept. for the year ending 31st Mar., 1929, vol. 1–2. pl. Madras, 1930.

ieger, Heinrich: Die messung der wirtschaftlichen leistungsfähigkeit des waldes. 263 pp. illus., diagrs. Neudamm, J. Neumann, 1929.

ete, Bernard E.: Ohio forest fire manual. 35 pp. Wooster, O., 1929. (Ohio—Agricultural experiment station—Dept. of forestry. Forestry publication no. 5.)

acAloney, Harvey J.: The white pine weevil (Pissodes strobi Pack): Its biology and control. 87 pp. illus., pl., diagrs. Syracuse, N. Y., 1930. (N. Y. state college of forestry. Technical publication no. 28.)

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aryland—Conservation dept.: Seventh annual report, 1929. 166 pp. illus., pl. Baltimore, Md., 1930.

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ew York—Conservation dept.: Nineteenth annual report for the year 1929. 489 pp. illus. Albany 1930.

regon—State board of forestry: Nineteenth annual reports of the state forester for the year ending Dec. 31, 1929. 38 pp. illus. Salem, Oreg., 1930.

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Thone, Frank Ernest Aloysius: Trees and flowers of Yellowstone national park. 90 pp. illus., pl. St. Paul, J. E. Haynes, 1929.

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Victoria—Forests commission: Tenth annual report, financial year 1928–29. 26 pp. diagrs. Melbourne, 1929.

Western forestry and conservation association: Cooperative forest study of the Grays Harblr area, Washington. 79 pp. illus., map, diagrs. Portland, Oreg., 1929.

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Centralblatt für das gesamte forstwesen, 1930, vol. 56, no. 1.—Der südosteuropaische urwald und seine überführung in wirtschaftswald, by Jul. Fröhlich, pp. 1–17, illus., pl.

Ecology, Jan. 1930.—The vegetation of Heart's Content, a virgin forest in northwestern Pannsylvania, by H. J. Lutz, pp. 1–29; Biological decomposition of some types of litter from North American forests, by Elias Melin, pp. 72–101, diagrs.; Light and moisture in forestry, by Gustaf A. Pearson, pp. 145–160, illus.

Empire forestry journal, 1929.—Air survey and forestry, by C. R. Robbins, pp. 205–228, pl., maps.

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Journal of forestry, Jan. 1930.—Organization and its relation to fire control in the Angeles national forest, by M. H. Davis, pp. 8–15; Growth and its relation to thinning: sample plot studies in mixed hardwood stands, by C. H. Guise, pp. 16–22; A comparison of several of the growth per cent methods of predicting growth, by Paul O. Rudolf, pp. 28–33; Sterilization of coniferous seed-beds with low-pressure steam, by Theodore C. Scheffer, pp. 42–49, illus.; Length of exposure to low temperature as a factor in the hardening process in tree seedlings, by R. B. Harvey, pp. 50–53, illus.; Breakage no obstacle to selective logging, by E. L. Mowat, pp. 99–100; Growth in swamps before and after drainage, by Raphael Zon & J. L. Averell, pp. 100–101; Girdling hardwoods to release spruce and balsam fir, by M. Westveld, p. 101; Interception of rainfall by the forest, by J. A. Mitchell, pp. 101–102; New England flood control: preliminary report of a special committee of the New England section of the Society of American foresters, pp. 103–107.

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Pulpwood, January, 1930.—A national system of forest fire protection, pp. 1–3; Fourth memorandum on pulpwood volume tables and solid contents of the cord, by Austin Cary, pp. 5–8. February, 1930, The forest fire insurance study, by H. B. Shepard, pp. 1–3.

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Recent Publications of the Forest Servic

Farmers' Bulletins: 1123, Growing and Planting Har wood Seedlings (reprint), 1177, The Care and In provement of the Farm Woods (reprint).

National Forest Map Folders: White Mountai Santa Fe, California; Road and Information Map Washington.

National Forest Administration Maps; ¼-inch, Abs roka and Kaibab.

Denison College Library

FOREST WORKER

July, 1930

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UNITED STATES DEPARTMENT OF AGRICULTURE

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A Bibliography of Bibliographies of North American Forestry Literature

In connection with work under way on a bibliography of North American forestry literature, intended to include titles of all forestry material published in Canada, the United States, Mexico, the West Indies, and Hawaii prior to January 1, 1930, the National Research Council and the United States Forest Service have tentatively prepared a list of existing published bibliographies of such material. This list, including some 300 titles divided under 12 heads, will be distributed to a limited number of individuals who may be able to add to it. Anyone not receiving a copy of this bibliography of bibliographies who may be able to add to it is invited to write for a copy, addressing the library, United States Forest Service, Washington, D. C.

National Shade Tree Conference t be Held in Cleveland

The Sixth National Shade Tree Conference wil held in Cleveland, Ohio, August 27–29.

The conference is composed of commercial experts, plant pathologists, entomologists, hort turists, foresters, and others particularly intere in shade-tree problems. In addition to a prograr papers and discussions there will be educati exhibits and demonstrations of horticultural tools equipment. The meetings will be held in the Clevel Public Auditorium and will be open to the pul The local committee arranging for the conferenc headed by Charles F. Irish, 418 East One hundred fifth Street, Cleveland, Ohio.

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ashington, D. C. JULY, 1930 Vol. 6, No. 4

State Forestry

eorgia Commercial Forestry Conference

A Georgia Commercial Forestry Conference was held Savannah, Ga., May 26–28, through arrangement of Georgia Forestry Association and the United States amber of Commerce. Frank M. Oliver, repre- ting the chamber of commerce on the program, took his subject the great community interest of the stess city in forest industries. Savannah's yearly pments of naval stores average from $16,000,000 to ,000,000 in value, Mr. Oliver said; its factories pply more than two-thirds of all the rosin oil now used the United States; its 25 wood-working plants con- ne annually nearly 200,000,000 board feet of lumber, ploy nearly 2,000 people, and have an annual output ued at $8,000,000; and the annual production of nber within a radius of 75 miles of the city is approxi- tely 300,000,000 board feet.

ordon E. Reynolds, of the Reynolds Lumber Co., any, Ga., pointed out that in Georgia the annual ome from the lumber business exceeds the total ital of all State and national banks. The State's nber products, aside from naval stores, pulpwood, ., are valued at about $45,000,000 per year. Under per forest management, he said, a yearly production from 300 to 500 board feet of lumber per acre can be ected from forest lands in Georgia.

. F. Eldredge discussed fire protection and the re- ts of fire protection on the Suwanee Forest, which manages for the Superior Pine Products Co., Fargo, . He attributed to forest protection the fact that the past four years the average number of trees inches or more in diameter to the acre on this forest increased from 18 to 34. He mentioned also the rease in game, attributable to the increase in natural er resulting from fire protection, saying that accord- to the best information he could gather there were y three bands of deer on the property four years and that at the present time he knows of 22 differ- bands. Turkey, quail, and bear, also, have in- ased markedly. Mr. Eldredge emphasized the value fire-prevention measures and described those in ctice on the Suwanee Forest, giving details as the kinds of equipment used, cost of operation, and annual average fire loss. On 90 per cent of the a, he said, the company has obtained the successful peration of cattlemen in preventing fires.

A. E. Clift, president of the Central of Georgia Railway, said that railroads purchase 11 per cent of this country's lumber output, crossties not included. In 1929 the railroads of the United States used 105,000,000 crossties, of which 90,000,000 were treated. In turn, the forest industries create an important element of railroad traffic. The Central of Georgia serves an agricultural country, yet forest products account for 20 per cent of its traffic while agricultural products account for only 13 per cent.

Charles S. Herty, industrial chemist, speaking of the slash pine as a source of pulpwood, said that he has had the wood of young untapped slash pine analyzed and that the wood has been found to contain less than 1 per cent of rosin.

R. D. Garver, of the Forest Products Laboratory, explained the desirability of selective logging as a protective measure from the standpoint of fire, community and industrial stabilization, and soil erosion, and finally as a measure to bring about more efficient use of forest land.

One of the resolutions adopted by the conference recommends that Congress make adequate appropriations for planting idle lands on national forests. Another urges the establishment of a naval stores experiment station at which the Bureau of Chemistry and Soils may develop more efficient methods of producing rosin and turpentine from the crude gum.

At a meeting held in conjunction with the commercial conference the Georgia Forestry Association adopted a resolution instructing its legislative committee to prepare a forest taxation bill designed to encourage reforestation of waste lands, with a view to having the bill presented at the next session of the Georgia General Assembly. The association again approved the idea of the Federal Government purchasing a tract of land in Georgia not exceeding 10,000 acres for the purpose of establishing and developing a station for experiments bearing on naval-stores production and timber growing, and directed its legislative committee to prepare a bill to permit the purchase.

T. Guy Woolford, Atlanta, was unanimously reelected president of the Georgia Forestry Association for the coming year. The society reelected, also, its secretary, Bonnell H. Stone, and its vice presidents, Mrs. M. E. Judd, S. W. Morgan, and W. M. Folks.

South Carolina Establishes Forest Districts

District offices have been established by the South Carolina Forestry Commission at Florence and Spartanburg. The Florence office will serve a district comprising most of the coastal plain region of the State, where the State forestry commission is now cooperating with a number of landowners in forest-fire control and other forestry work. A county-wide fire-control organization has been practically completed for Kershaw County in this district and it is contemplated that this plan will be extended to other counties. The Spartanburg district includes the Piedmont region of the State. Cooperation with timberland owners in this district has not yet been developed. D. Y. Lenhart, a graduate of the Pennsylvania State Forest School who has had several years' experience in public and private work in Pennsylvania and one year's graduate study in forestry at the North Carolina State College, is district forester at Florence. N. T. Barron, a forestry graduate of the University of Michigan who has for several years been connected with Hall, Kellogg & Co., consulting foresters, at Hot Springs, Ark., is in charge of the Spartanburg district.

As soon as the necessary funds are available State Forester Staley expects to form two additional districts, one in the Piedmont and one in the coastal plain region.

Forest Planting in Hawaii

In Hawaii, where the forest planting season extends throughout the year, the forestry division planted 297,648 trees on 20 forest reserves in the 12 months ending with November, 1929. About three-fourths of this number were white ash (*Fraxinus americana*), cajuput or paperbark (*Melaleuca leucadendron*), silky oak (*Grevillea robusta*), cassowary-tree or "swamp oak" (*Casuarina glauca*), redwood (*Sequoia sempervirens*), and koa (*Acacia koa*). In November alone 41 different species were planted. On November 15, when the soil had been loosened by rains and a gentle breeze with a velocity of 3 miles per hour was blowing from the direction of Niihau, Assistant Forester A. W. Duvel ascended in an Army airplane and broadcast 1,689 pounds of tree seed over bare and eroded ridges along the Kauai coast between Lapa Ridge and Kalalau Valley. In the same month the forestry division, with the cooperation of the Army, began to plant trees on the large eroded earth scar back of Fort Shafter. Enlisted men used dynamite in preparing holes for the trees. One-third to one-half stick of dynamite was used for each hole. By this method 10 men were able to make from 250 to 300 holes a day. Cracking the earth with dynamite put it in better condition for tree planting than if holes had been dug, Territorial Forester C. S. Judd reports.

Clarke-McNary Tree Distribution in 19

In the calendar year 1929 Porto Rico and 14 Stat substantially exceeded their 1928 records in number forest trees distributed to farmers under cooperati agreements with the Federal Government. The mo striking increases in number of trees so distribut were the following: Virginia, from 31,007 to 239,32 Georgia, from 24,000 to 263,300; Montana, fro 43,500 to 290,700; Alabama, from 48,600 to 303,90 North Dakota, from 47,000 to 147,500; Tennesse from 91,800 to 205,800; North Carolina, from 175,9 to 314,200. Some of the largest distributors of planti stock under Clarke-McNary agreements, on the oth hand, reported considerable decreases in the quantiti distributed to farmers; New York's total fell fro 9,840,000 to 7,978,000, Pennsylvania's from 9,062,3 to 6,126,219, Massachusetts' from 1,139,700 to 689,00 and Vermont's from 862,500 to 410,100. The year total for all cooperators in this work was 25,242,697, compared with 28,757,448 in 1928. In most cases di tribution of planting stock to farmers was principall or solely to provide for timber production. Establis ment of shelter belts and windbreaks was a minor pu pose in 15 States and Porto Rico, had equal place wit timber growing in Iowa, was the major purpose i Oklahoma, Missouri, Nebraska, Kansas, Colorado, an Washington, and was the sole purpose in Montan North Dakota, Wyoming, California, Oregon, and Ha waii. The total number of trees distributed to farm ers by the cooperating agencies, the species and age predominating among the stock so distributed, and th approximate range of prices to the farmer per 1,00 trees, were as follows:

Maine: 131,450; northern white pine, white spruc Norway pine, Norway spruce; 3-year transplants; $

New Hampshire: 588,163; northern white pine, N way pine, white spruce; 3-year and 4-year trans plants; $6.50 to $7.50.

Vermont: 410,100; northern white pine, Norway pin Norway spruce, Scotch pine; 2–1-year and 2–2-yea transplants; $4 to $7.

Massachusetts: 689,000; northern white pine, Nor way pine, Norway spruce, Scotch pine, white spruce 3-year to 6-year transplants $7.50 to $14.

Connecticut: 463,300; Norway pine, northern whit pine, Norway spruce; 2-year and 3-year seedlings 2–1-year and 2–2-year transplants; $4 to $10.

New York: 7,978,000; Norway spruce, Norway pine northern white pine, white spruce, Scotch pine northern white cedar, balsam fir, European larch 2-year seedlings, 3-year and 4-year transplants; $ to $5.

Pennsylvania: 6,126,219; Scotch pine, Norway pine Norway spruce, northern white pine, Japanese larch, white spruce, pitch pine, white ash; 2-year to 4-year seedlings, 2–2-year transplants; $2 and $5.

w Jersey: 674,100; Norway pine, Norway spruce, orthern white pine; 2-year seedlings; $3.50 to $6.

ryland: 222,039; Norway pine, Norway spruce, oblolly pine, Scotch pine, northern white pine; -year seedlings, 1-year and 2-year transplants; $5 upward.

aware: 29,200; Norway spruce, Scotch pine, Norway pine; 3-year and 4-year seedlings, 4-year transplants; $2.50 and $5.

ginia: 239,325; loblolly pine, shortleaf pine, black ocust; 1-year and 2-year seedlings; $3 to $10.

rth Carolina: 314,200; longleaf pine, loblolly pine, hortleaf pine; 1-year seedlings, 2-year transplants; 3.

orgia: 263,300; slash pine, loblolly pine, longleaf ine; 1-year seedlings; $2.50 and $3.

rida: 16,300; slash pine; 1-year seedlings; $4.

bama: 303,900; longleaf pine, Norway pine, loblolly ine, black walnut, slash pine, black locust; 1-year eedlings; $1.50 and $2.50.

uisiana: 357,000; slash pine, longleaf pine, black ocust, loblolly pine, Red River oak; 1-year seedlings; $1.50.

lahoma: 82,200; Chinese elm, Australian pine; -year and 2-year seedlings; $5 and $10.

io: 1,512,981; Norway pine, Scotch pine, Norway spruce, Corsican pine, black locust, Austrian pine, white ash, yellow poplar, western yellow pine, sugar maple; 1-year, 2-year, and 3-year seedlings, 1–1-year and 2–1-year transplants; $1.50 to $8.

liana: 357,120; Norway spruce, Norway pine, black ocust, Scotch pine, northern white pine, black walnut; 1-year and 3-year seedlings, 2–1-year and 3–1-year transplants; $2.50 to $10.

ntucky: 78,859; black locust, black walnut; 1-year and 2-year seedlings; $5 to $12.

nnessee: 205,800; black locust; 1-year seedlings; $1.50.

issouri: 2,400; oriental arborvitæ; 2-year seedlings; free.

wa: 86,800; black locust, Norway pine, Scotch pine; 1-year seedlings, 5–6-year transplants; $5 upward.

ontana: 290,700; Siberian pea-tree, boxelder, American elm, green ash, cottonwood; 1-year seedlings; $5.

aho: 132,200; black locust; 2-year seedlings; $3.50.

orth Dakota: 147,500; green ash, boxelder, Siberian pea-tree, American elm; 1-year and 2-year seedlings; free.

ebraska: 707,000; Scotch pine, American elm, Russian mulberry, Russian olive, cottonwood, honeylocust, Siberian pea-tree, Austrian pine, catalpa, green ash; 1-year seedlings, 1–1-year and 2–1-year transplants; $10.

ansas: 36,200; Osage-orange, western yellow pine; 1-year seedlings, 3-year and 4-year transplants; $10 upward.

Wyoming: 43,376; western yellow pine, cottonwood; 2-year seedlings, 2–1-year to 2–3-year transplants; $10 upward.

Colorado: 165,300; western yellow pine, honeylocust, American elm, Douglas fir; 2-year seedlings, 2–1-year and 3–1-year transplants; $10 upward.

California: 34,860; Monterey pine, western yellow pine; 1-year and 2-year seedlings; $5.

Hawaii: 200,900; redwood, red gum, paperbark, highland ironwood, swamp gum, swampmahogany; ½–1-year transplants; $6.60 to $25.

Washington: 44,800; black locust, Chinese elm; 1-year to 3-year seedlings; $2.50 upward.

Oregon: 124,100; western yellow pine, black locust, green ash; 1–1-year and 1–2-year transplants; $2.50.

Michigan: 891,630; Norway spruce, white spruce, northern white pine, Norway pine, Scotch pine, jack pine, Austrian pine; 1-year to 4-year seedlings; $3 upward.

Wisconsin: 676,575; Norway pine, northern white pine, Norway spruce, Norway pine, Scotch pine; 3-year and 4-year seedlings, 2–2-year transplants; $4 to $8.

Porto Rico: 621,800; cigarbox cedar, saman, pochote, mahogany, Australian pine, capa blanca, guama piñon; 3-month to 12-month seedlings; free.

Two other States, West Virginia and South Carolina, were operating forest nurseries under agreements with the Federal Government in 1929 but had no planting stock available for distribution to farmers in that year.

In addition to the number of trees distributed to farmers, the cooperating agencies distributed 18,514,890 trees for planting on private lands other than farms and provided 22,964,414 trees for planting on State lands. Thus the cooperators distributed in all 67,722,001 trees, or 843,290 less than in 1928.

In a few cases forest planting stock was produced by State agencies not having cooperative agreements with the Federal Government.

* * *

Alliance, Ohio, started a municipal forest plantation this year, the Izaak Walton League providing labor for the planting of 12,000 trees. At Canton, Ohio, members of the league themselves planted 5,000 trees on the city's sewage disposal farm.

* * *

John A. McDermott, for the past 10 years president of the Cortland County (N. Y.) Sportsmen's Association, offered a day's services as tree planter and instructor in tree planting without charge this spring to any Cortland County landowner or organization placing an order with him for 100,000 State-grown trees. Four other members of the association joined in Mr. McDermott's offer, which included the use of his car.

New York State Nurseries Make Record Spring Distribution

New York's State forest nurseries sent out 23,000,000 trees for planting in the spring of 1930, exceeding by 3,000,000 their record-breaking spring distribution of last year. About 4,500,000 of the trees went to the planting of some 4,000 acres of county forests, in 16 of the counties that submitted county forest programs this year for approval under the law providing for State aid in the establishment of county forests. Otsego County made the largest county forest plantation, with 1,000,000 trees. The other counties active in county forest planting this spring, with the number of trees planted by each, were as follows: Lewis, 607,000; Erie, 510,000; St. Lawrence, 407,000; Essex, 400,000; Jefferson, 308,000; Onondaga, 213,000; Schoharie, 200,000; Chautauqua, 200,000; Oswego, 145,000; Madison, 105,000; Oneida, 100,000; Steuben, 100,000; Montgomery, 80,000; Seneca, 30,000; Cattaraugus, 30,000.

Shipments of State-raised trees went out to more than 2,500 individuals, municipalities, organizations, and industrial concerns. For planting four areas of abandoned farm land recently acquired by the State 2,700,000 trees were requisitioned.

T. C. Luther Protects His Forests from Fire and Pests

Thomas C. Luther, who for several years has been planting more than 1,000,000 trees a year on his 10,000-acre estate in Saratoga County, N. Y., is substituting forest protection work for planting in 1930. With his son, Thomas F. Luther, he is brushing out and widening the 35 miles of roads on the estate and building fire lines around his various plantations. In addition the Luthers are eradicating currant and gooseberry bushes in order to protect northern white pine from blister rust and are taking measures to eradicate the white pine weevil.

Besides more than 5,000 acres of Norway pine, northern white pine, and Scotch pine plantations ranging in age from 1 to 15 years the Luther property includes several thousand acres of mature timber, which is under scientific management.

* * *

The New York Legislature has proposed a constitutional amendment providing for the appropriation of $19,000,000 over a period of 11 years for establishing forest nurseries and for acquiring land and reforesting it. Suitable lands within the forest preserve counties but outside the Adirondack and Catskill parks would be eligible for purchase and reforestation under the proposed amendment. The proposal will be decided upon by popular vote if it is approved by the next legislature.

New Porto Rico Laws Permit Acquisiti of National and Insular Forests

An act of the Legislature of Porto Rico approv April 12, 1930, abolishes the limitation on the acrea that the United States Government may purchase the island for watershed protection, tree productio and other purposes. A second recent act authoriz the insular department of agriculture to acquire la for insular forest reserves by purchase or by condemn tion. Lands suitable either for timber production or f watershed protection may be acquired under this la The maximum price is set at $20 per acre. The acqu sition fund is to be made up of receipts from sales products of the existing reserves, receipts from sale isolated lands controlled by the insular division of fo estry, and any unexpended portions of the division annual appropriations.

A third act, designed to encourage the growing timber on watersheds of rivers, provides that the i sular commissioner of agriculture may classify as auxi ary insular forests privately owned lands at least cuerdas (50.5 acres) in extent and not less than 1,0 feet above sea level which are devoted to growing tim ber either of natural growth or planted. Tree-growin operations on such lands will be supervised by the div sion of forestry, and the lands will be exempt from taxa tion so long as they remain classified. Owners will re tain the privilege of removing timber needed for use o the property.

New York Amends its Forest Tax La

An act of the New York Legislature approved th year extends to all forest plantations in the State th provision, previously applying only to forest planta tions established since January 1, 1920, for assessmen of reforestation land on the basis of its value exclusiv of the value of the trees. It adds the proviso that lan classified under the tax laws as reforestation land sha at no time be assessed at a valuation higher than tha made when the application is acted upon. This provi sion is made retroactive on condition that a new appli cation for classification is filed by the owner and i approved. The act also eliminates the provision per mitting an owner to appeal from the decision of th assessors to the conservation commission in case o dispute as to the stumpage value of wood or timbe on any classified land.

* * *

The first hearing held under the Oregon forest taxation law of 1929 has resulted in the classification o 97,955 acres of land in Clatsop County as reforestatio land subject to an annual fee of 5 cents per acre only with a yield tax of 12½ per cent due when the timber cro is harvested.

ssachusetts State Forester May Re-
uire Town Forest Wardens to Main-
ain Patrol

assachusetts has emerged from an exceptionally
re spring fire season with a new law under which
State forester may require any town forest warden
naintain a fire-prevention patrol in the forests of
town during periods of extreme drought. The
nse of such patrol, like that of fire-suppression
done by town wardens at the direction of the
forester under provisions of a law enacted in
, is to be borne solely by the town if the town's
ation is as high as $1,250,000; in the case of a town
ng a valuation below that figure, if the expense
ne patrol and of fire suppression in any one year
eds one-twentieth of 1 per cent of the town's
ation the State will pay half the surplus, up to a
imum of $250 a year.

his law, recognizing fire-prevention work as an
vity no less important that fire suppression, has
ne object the protection of a town already main-
ing forest patrol against the spread of fire from
hboring towns that have not adopted the prac-
of patrolling their forests.

* * *

nce last summer a headquarters building has been
ted and equipped in each of the 14 fire districts of
higan. At each building two fast trucks equipped
tools and materials needed in fighting forest fires
held in readiness to answer calls from wardens.
ck drivers are on call 24 hours a day during the
season. The headquarters buildings are located
Ewen, Baraga, Marquette, Crystal Falls, Escanaba,
ut Lake, Newberry, Boyne City, Atlanta, Mio,
common, Traverse City, Baldwin, and Gladwin.

* * *

he life of the commission created by the New York
islature in 1929 to investigate reforestation condi-
s in the State and report to the legislature by March
1930, has been extended by a year. Enlargement
he commission by one member has been provided for
the legislature.

* * *

county forestry association was organized in
rch of this year by private citizens of Wilkes
unty, N. C., acting on their own initiative. The
ociation, which now has a membership of 50, is
erested in county and State forests and in State
ks. It advocates the use of lands reverting to the
nty as county forests. Officers of the association
T. B. Finley, president, and H. C. Landon, secre-
y.

Railroad Employs Wardens and Special Crews to Burn Safety Strips

Five wardens recommended by Richard R. Houpt, district forester of the cornplanter district of Pennsylvania, were hired by the Pennsylvania Railroad this year to direct the burning of safety strips along its lines in that district. Each warden organized his own crew of from five to seven men. (One warden had a crew of 16 men while clearing the back line.) The season's work was the burning of 35 miles of safety strip between the New York State line and Tionesta, Pa. Four crews which over most of their sections had an old road from which to burn burned 24.5 miles of safety strip at an average cost of $20.40 per mile. The fifth crew cleared 12¾ miles of line at an expense of about $27.43 per mile and burned 11 miles at a cost of about $21.56 per mile. Cost figures for safety-strip burning in each case cover a little time spent in fighting fire. The crews made an average of 1 mile of safety strip per day. They did the work as early as weather permitted, between March 17 and April 29. If men regularly employed by the railroad had been assigned to this work, District Forester Houpt remarks, it would almost certainly have been deferred to a less favorable season because of the track-repair work always necessary in early spring.

* * *

Organization of seven new timber-protective units in Georgia brings the State's total to 32 at the beginning of the new fiscal year, on July 1. Private funds totaling $89,000 have been budgeted for expenditure during the year in protecting the 1,383,000 acres of land included in these units. According to figures of the Georgia Forest Service the annual cost of protecting forest land in that State averages about 4 cents per acre. Timber owners who organize protective units and use recommended methods of fire prevention are reimbursed from Federal and State funds to the extent of 30 cents on the dollar.

* * *

The Pennsylvania Department of Forests and Waters reports shipment of 9,250,000 State-raised forest tree seedlings for planting in the spring of 1930.

* * *

The International Log Rule has been recognized by an act of the New York Legislature as the standard for measuring logs in that State.

* * *

Sale of timber products in Jasper County, Tex., in 1929 brought an income of more than $4,000,000, according to figures compiled by the Jasper Chamber of Commerce.

Forest Nurseryman Feeds His Enemies

Birds that attacked the 1929 crop of pine seedlings in the Texas State forest nursery readily accepted a substitute meal of oats that was offered to them by the nursery superintendent, V. V. Bean. When scarecrow and shotgun had been tried without success Mr. Bean scattered some oats in the paths between the nursery beds. The birds soon found and devoured the oats, and then flew away almost without touching a seedling. Oats were scattered in the nursery paths every day thereafter with the same results until the seedlings had passed the tender age at which they were attractive to the birds. One bushel of oats gave protection for the season.

* * *

Virginia is making a special effort to restock its streams with fish and its forests with game. The State game commission has established a system of fish nurseries and plans to distribute deer and wild turkeys on national forests in Virginia, on areas lected by the forest supervisors. To provide food game the commission will have buckwheat and planted on old fields, and to protect it the State put a bounty on wildcats. Herbert K. Job has b employed to tour the State as a lecturer on wild- conservation, using lantern slides and motion pictu

* * *

The West Virginia State forestry organization tributed 200,000 forest trees for planting this spri of which 16,000 were grown in a temporary St nursery and the remainder were purchased outside State.

* * *

Increased demand for planting stock to be used establishing shelter belts on North Dakota far resulted this spring in shipment of 170,000 trees fr the State forest nursery to 360 individuals.

Education and Extension

Institute of Paper Chemistry Established at Lawrence College

An institute of paper chemistry, a graduate school for the training of chemists in the pulp and paper industry, has been established at Lawrence College, Appleton, Wis. Wisconsin paper mills cooperating with the college in establishing the institute have subscribed $300,000 to maintain it for five years. Anonymous donors have given $15,500 to establish a research library and pay the salary of a librarian, and several paper companies and allied industries have given fellowships of $500 a year each. Henry M. Wriston, president of Lawrence College, is director. Otto Kress, who was at one time in charge of the pulp and paper section of the United States Forest Products Laboratory and has recently been superintendent of manufacture for the Thilmany Pulp & Paper Co., Kaukauna, Wis., is technical director. The faculty includes 7, 3 on full time and 4 on part time. Harry Fletcher Lewis, at one time research chemist for the National Aniline Chemical Co., Buffalo, N. Y., is professor of organic chemistry. Hjordes Roseth, Swedish expert in paper chemistry and research bibliography, is librarian. Courses are offered leading to the degrees of master of science and doctor of philosophy. The board of trustees includes Ernst Mahler, a vice president of the Kimberly-Clark Corporation, Neenah; Monroe A. Wertheimer, president of the Thilmany Pulp & Paper Co., Kaukauna; D. Clark Everest, vice president and general manager of the Marathon Paper Mills at Rothschild; Hugh Stran president of the John Strange Paper Co., Menash D. K. Brown, vice president of the Neenah Pap Co.; and L. M. Alexander, president of the Nekoos Edwards Paper Co., Port Edwards.

North Carolina State College Expan its Forestry Work

The department of forestry established by t North Carolina State College on February 1, 19 with J. V. Hofmann as head, is to expand into forest school at the beginning of the new year the fall of 1930. In the past year the department enrollment included 71 regular forestry students a 13 seniors in the School of Agriculture who we registered for a course in principles of forestry. T college graduated 17 men with forestry degrees 1930, every one of whom was on the honor roll of t class.

A demonstration forest of about 300 acres has bee given to the college by George Watts Hill. Thi area is rugged in topography and includes a wid variety of types. It is located on paved highwa No. 13, known as the Roxboro Road, 17 miles nort of Durham and 40 miles from the college. The pres ent stand of timber large enough to be used for pulp wood, poles, posts, and saw timber is estimated b Doctor Hofmann at about 3,000,000 board feet. camp will be established to house students while the are doing special work on this area.

n arboretum is being developed on an 80-acre t acquired for the use of the forest school on e 10, adjoining the city limits of Raleigh on the h. This tract is traversed by Walnut Creek and udes some wet areas and upland. Doctor Hofn finds it admirably suited for an arboretum use it will provide for the large number of swamp s and shrubs found in the coastal region. At ent about 60 species of native and foreign trees e been planted. About 10 to 30 trees of each ies are used, planted in mixture and in groups.

he Poole Woods, a virgin loblolly and shortleaf pine of approximately 75 acres located about 4 miles of Raleigh, will be available to the school for rech purposes.

he forestry field work done thus far by the college consisted in an intensive cruise of about 50 acres of berland on the Camp Polk prison farm, and the iation on this area of experiments in different hods of cutting. A cooperative plan agreed upon e time ago gives the forest school supervision of the agement of the whole 1,000 acres of timberland on prison farm, and makes prison labor available for ting and milling the timber. Doctor Hofmann sees that with good management the timber protion on this land, now nearly three-quarters of a d per acre per year, can be increased to at least 1 d per acre per year. If the whole 1,000-acre tract ut in proper shape, he says, it should meet the prison p's requirements for timber and for about 500 ds of fuel wood a year and should also provide some terial for sale.

nnsylvania Opens Forest Research Institute

ormal opening of the Pennsylvania Forest Research titute, at Mont Alto, Franklin County, Pa., took ce on June 5. Before a gathering of about 300 rle H. Clapp, chief of the branch of research, United tes Forest Service, outlined the significance of est research and Joseph S. Illick, State forester of nnsylvania, traced the development of forest rerch activities in Pennsylvania and told of the plans the new institute. In the afternoon about 200 ests joined in a motor tour to the 12½-acre Mont o State Forest Nursery and to the Mont Alto and chaux State Forests, where they inspected improvent cuttings, growth study plots, various experimental d other plantations, and a Scotch pine seed supply tion. The guests received as souvenirs copies of Rerch Bulletin 1 of the Pennsylvania Department of rests and Waters, entitled "A Guide to Forestry udies and Demonstrations on the Mont Alto and ichaux State Forests." This illustrated bulletin ts 84 forest study plots and demonstrations, reprenting work over a period of 30 years. The plots e plainly marked on the ground with numbers so as to be identified with the descriptions given in the bulletin.

Pennsylvania had a forestry investigative committee as long ago as 1888. The State established its first forest nursery, at Mont Alto, in 1902 and created an office of research in the department of forestry in 1920. During the past decade from two to four technical foresters have been engaged in forest research with headquarters at Harrisburg. The new forest research institute, which is a part of the State department of forests and waters separate both from the forest administrative organization and from the State forest school, has a staff of seven research foresters headed by Willis M. Baker, formerly associate State forester of New Jersey. It is planned to add one research entomologist and several resident fellows, and from time to time to employ temporarily additional research specialists.

The institute has as its purpose the betterment of forest practice on 13,000,000 acres of forest land in the State of Pennsylvania, of which 1,500,000 acres is now owned by the State. The subjects with which it intends to deal include forest fire protection, white pine blister rust control, control of destructive forest insects, improvement of forest types, improvement of cutting methods, seed selection, problems of reforestation, tree growth and yield, wood utilization, and deer damage. It contemplates a survey of Pennsylvania's forest resources.

Although the institute does not plan to give courses of instruction, it will cooperate with universities and colleges in offering opportunity for graduate work leading to advanced degrees. It will endeavor to interest forest land owners in the results of its research through demonstrations, conferences, lectures, radio talks, and the distribution of publications.

Offices, laboratories, and library of the institute are in Science Hall, one of the buildings included in the Mont Alto plant of the Pennsylvania State Forest School.

* * *

A recent accession reported by the Pennsylvania State Forest School is the tree and shrub herbarium of the late John W. Harshberger, former professor of botany at the University of Pennsylvania. Doctor Harshberger bequeathed his herbarium to the school.

* * *

In order to provide New York tree planters with helpful advice as to choice of species with reference to soil and other local conditions, as to choice of mixture of species, and as to choice of planting methods, the New York State College of Forestry has undertaken a survey of forest plantations in the State. Prof. Svend Heiberg, of the department of silviculture, has charge of the study. He will have two assistants. The State conservation department will cooperate by providing records as to age and growth of plantations.

Press Takes First Rank as Educational Medium for Forestry Bureaus

The press is the most effective single medium of public education in forestry, according to the replies made by State forestry organizations and the United States Forest Service to a questionnaire recently circulated by the Minnesota Forest Service. It stands first in the esteem of at least 10 of the 31 organizations reporting and second in that of 10 others. Personal interviews are the medium highest in favor with 4 State organizations, motion pictures with 3, lectures and talks with 2. Louisiana depends most on Forest Week observance, Delaware on forestry demonstrations, Indiana on its forest nursery, Mississippi on work in the schools, and Minnesota on exhibits.

Forestry has a place in the public-school instruction of 8 of the 29 States reporting on this point and introduction of forestry teaching into the public schools is contemplated by 4 others. Nearly all the organizations reporting offer lectures and talks, five of them employing someone on a full or part time basis specifically for this work. About 8 States reported general distribution of a State forestry periodical. Of 30 organizations reporting as to the use of exhibits 25 make use of exhibits at county and State fairs and elsewhere; 3 of these, together with 1 that has abandoned the practice, expressed doubt as to whether the results obtained through the use of exhibits justify the cost. Motion pictures are used by 8 of the organizations, radio by 3.

Cornell Teaches County Officials How to Plant Trees

A tree-planters' school was held at Cornell University on March 27–28 for the benefit of men in charge of the planting of county forests. Of the 20 New York counties that accepted for this year the State's offer of aid in establishing county forests more than half had not previously undertaken such work, writes Extension Forester J. A. Cope, so that in a number of cases responsibility for directing county reforestation work was delegated to men with no previous experience in that line. Thirteen counties were represented by the 48 men who registered as students in the 2-day school. At morning sessions members of the Cornell forestry faculty discussed considerations governing selection of species, spacing, and the planting of species in mixture. The first afternoon was devoted to a field trip, led by Professor Cope, to the nursery of the agricultural college and to forest plantations in the vicinity of Ithaca ranging in age from 5 to 50 years. On the second afternoon 30 planting supervisors lined up in crews of two with grub hoes and a quantity of 4-year-old northern white pine transplants provided by the State conservation department, and under the direction of Prof. S. N. Spring planted the trees on part of the Ithaca watershed. Several types of planting t
were tried out, but in the heavy Volusia soils the g
hoe showed the best results. Both the hole and the
method of planting were tried out. The rope met
of keeping rows and spacing uniform was demonstra
and proved its value in open land, particularly on st
hillsides where flags can not be set up at any gr
distance ahead.

Cornell Continues to Put Forestry o the Air

The forestry faculty of the New York State Coll
of Agriculture remains faithful to the radio audien
The school's radio program, broadcast over radio s
tion WEAI, Cornell University, was continued throu
the spring months with the following talks:

APRIL

Handling, Planting, and Care of Forest Tree Seedlings	J. E. Davis.
School Forests	J. A. Cope.
Why Plant Evergreens?	F. I. Righter.
Some Reforestation Projects in Europe	R. S. Hosmer.

MAY

Protecting Woodlots from Grazing	S. N. Spring.
Let Nature Replant Your Trees	J. N. Spaeth.
Important Tree Diseases of New York State	D. S. Welch.
The Present Status of Chestnut	J. Bentley, jr.
The Tourist and the Forest Fires in the West	E. Fritz.
The Taxation of Forest Land	R. S. Hosmer.

JUNE

Western New York Forestry Tour	J. A. Cope.
White Pine Weevil	J. A. Cope.

◆

The University of Michigan Foresters' Associati
plans to establish a student loan fund as a memori
to Filibert Roth, first head of the university's depa
ment of forestry.

◆

The California State Automobile Association and t
Automobile Club of Southern California contribute
prizes totaling $400 in value for award in a forest-f
prevention essay contest held this spring in the Cal
fornia public schools. These prizes were offered
addition to bronze medals provided by the America
Forestry Association. The contest was sponsored b
the Stop Forest Fires Committee of California, whic
represents Federal and State park, forest, and roa
agencies, county supervisors, and automobile clubs.

ennessee Farmer Sells Timber Under Contract

ohn W. Cate, of Cleveland, Tenn., has sold the
ture oak, hickory, and ash on a 150-acre timber tract
der a contract, suggested by Extension Forester G.
Shivery, providing that the operator shall utilize the
rked timber down to the minimum merchantable
rd and shall pay for the lumber as it is scaled from
saw. Ties, dimension stock, and boards of all
des are to be produced from timber designated by
owner, who had Mr. Shivery's help in selecting the
es to be cut. The prices agreed upon are $10 per
00 board feet for oak and ash and $5 per 1,000
rd feet for hickory. The operator agreed to saw,
a rate not exceeding $5 per 1,000 board feet, any
s that the owner might deliver to the mill for the
rpose of making lumber for constructing or repairing
m buildings. He agreed to protect unmarked
ber from injury, and to tolerate no unnecessary
opping of sapling trees in making roadways.

Forestry House Attracts Interest at Indiana State Fair

Among its various means of arousing public interest
forestry the Indiana Department of Conservation
es high rank to the forestry building which it has
intained at the State fair grounds at Indianapolis
the last 15 years. The building is 30 by 40 feet
d has a porch with benches. It cost $957 in 1915.
interior is finished in panels of white oak. Typical
hibits are planting stock from the State forest nursery,
ounted specimens of leaves, twigs, flowers, and seed
Indiana trees and shrubs, pictures of birds accom-
nied by information as to the place of insects, weed
ed, and grain in the birds' diets, and a model of a farm,
der a water spray, illustrating the effect of forest
ver in preventing erosion. At one fair it was esti-
ated that nearly 10,000 people visited the building.
days of heavy attendance four men are sometimes
pt busy answering the visitors' questions.

* * *

More than 200 boys and girls in the 4-H forestry
ubs of Montgomery County, Tenn., have taken up
e black walnut planting project proposed by County
gent G. C. Wright. When the supply of walnuts
vailable for planting gave out during the past season
alnut seedlings were used. A number of boys as
ell as adults in the county are participating in Mr.
right's project for planting black locusts on poor
ils such as those worn out by growing too many
ccessive crops of tobacco. Ten or more demon-
ration plantings were made this year with 6,750
cust seedlings.

Planted Black Locusts Grow Tall Among Corn

Black locust seedlings planted on the farm of F. V. Peart at Rupert, Idaho, in the spring of 1928 as a combination farm woodland and shelter belt now have an average height of 12 feet and in a few cases are 2 inches in diameter, almost large enough to be used for picket fence posts, Extension Forester A. M. Sowder reports. The spacing was 6 by 6 feet. Twelve hundred trees per acre survived the second growing season. Mr. Peart has cultivated and irrigated the trees with care. In each of the two years following their planting he raised a half crop of corn in the space between the rows and between the trees in the rows. The corn crop supplied an additional motive for cultivation and gave the trees the benefit of side competition for light. Last winter Mr. Peart pruned off the side limbs. He will give the plantation intermittent irrigation and will continue winter pruning. He planned to seed the woodland to white clover and orchard grass this summer in order to obtain a forage cover before the trees shade the ground completely. Turkeys are allowed to run through the plantation and in the future some use is to be made of it for calf pasture. Part of the ground taken up by the plantation is a sandy patch that was difficult to cultivate.

Demonstration Tree Plantings in Iowa

This year's spring forestry activities on Iowa farms started 62 new demonstrations of windbreak planting in 11 counties and included follow-up work on 200 such demonstrations previously established in 32 other counties, Extension Forester I. T. Bode reports. Practically all such planting in Iowa is handled under a plan whereby a county is organized as a whole for the work and one demonstration is established in each township. Six counties have applied for the beginning of a windbreak-planting program in 1931. The trees used this year, numbering nearly 20,000, were furnished from the nursery at the Iowa State College without charge other than the cost of digging, packing, and transporting them. More than two-thirds were conifers.

Between 40 and 50 demonstration tree plantings for erosion control were begun in 19 counties of Iowa this spring under forestry extension service and county farm bureau supervision. Willow or cottonwood was planted in the wet soil in the bottoms of gullies and black locust was used in the dry clay soil of the banks and tops of gullies. Because it was found difficult to obtain black locust seedlings at the desired price 50 pounds of locust seed were distributed to as many farmers to be planted in garden rows. Seedlings grown from this seed will be dug and planted on eroded areas next year.

New Jersey 4-H Forestry Clubs

As leader of New Jersey's junior 4-H forestry club activities Extension Forester E. L. Scovell has not established any "required courses"; instead, he bases everything on spontaneous development of each child's individual interests. Seeing as the ultimate object of the 4-H forestry club program the establishment of a personal forestry interest on the part of members of the rising generation, he and his local club leaders offer guidance and help to the individual child in following out an interest in trees, in animals, in birds, or in some other nature-study subject. Mr. Scovell describes the club work as follows:

> The junior 4-H forestry club work is intended for rural and urban boys and girls aged 9 to 14 years, inclusive. First of all its purpose is to develop an interest in the woods. This it strives to do by showing children that the woods are filled with interesting things worthy of investigation and productive of much clean and healthful pleasure. Its broader purpose includes helping boys and girls to a knowledge of the woods and its inhabitants and of the primary principles of protecting and conserving forest resources.
>
> The whole program is founded on the principle that each child is an individual differing from other boys and girls in interests, character, abilities, and potentialities; that to teach a child to like the forests we must begin with the things in which the child is interested and in some way associate those known interests with the forests. This association may in some cases be made directly and in others may have to be brought about gradually by the skillful guidance of the leader. Once the association with the woods is made there will be a natural expansion of these normal interests. In keeping with this principle we have chosen a very flexible type of program rather than the yearly task type.
>
> Instead of thinking of our boys and girls as tools to demonstrate better practices to adults, we are thinking of them as future men and women whom we desire to feel the value of woodlands and help in woodland conservation and development. We give each child in the clubs individual attention, and use our subject matter and teaching methods only as tools for searching out and developing each child's interests and potentialities.
>
> We include in our program a great variety of projects and subprojects featuring different appeals and adapted to children of different ages. These are presented to each club in a mimeographed booklet, written in simple style and well illustrated, known as the leader's guide. Each member of the junior 4-H forestry clubs is encouraged to look through this booklet. He chooses the project that appeals to him, and that is the project he follows. The booklet is available to him for further reference. The local leader helps him only when requested or when it seems that a timely suggestion will reveal new prospects worthy of investigation. The club member is encouraged to feel that the project he is following is his, and that he is to depend on his own initiative and ability as much as possible.
>
> The clubs meet regularly, some twice a month and some weekly. They conduct their meetings according to parliamentary procedure. Under new business the members voluntarily report on and discuss things they have been doing, have seen, or are planning to do, also plans for club activities.

Mr. Scovell follows a similar plan in introduc forestry activities at summer camps of 4–H Clu Children in camp are given the opportunity to cho their subjects of investigation and to make someth with their hands, such as bird houses, plaster cast bird and animal tracks, or leaf prints, which they carry home as souvenirs.

Since the first two clubs were formed, in Decemb 1926, membership has grown, without solicitation, 2,000 at the beginning of 1930. The number of lo leaders has increased even faster. County school sup intendents and school teachers are giving enthusias support. Many helping teachers (assistant coun school superintendents) and other public-school tea ers are among the volunteer local club leaders w assist the county club agents.

The senior 4–H forestry club project, for boys ag 15 to 21 years, carries on into practical woodland ma agement. Two senior clubs have already been form

Pasadena Junior Chamber of Commer Parades for Forest Conservation an Protection

A big parade in which shovels took the place swords was the climax of a forest conservation-f prevention campaign held April 20–26 by the Pasade (Calif.) Junior Chamber of Commerce. Twenty floa depicted fire-prevention needs and forest uses, a several hundred Boy Scouts and members of t Angeles Forest Protective Association, the latter appea ing in fire-fighting costume with shovels and ax marched to the time of the local American Legion dru corps and the music of four bands. Thirty-five un of fire equipment including tank trucks and equipme trucks had place in the procession, which wound with a calliope. The parade terminated in the pla before the city hall, where a forest setting of pin cedars, brush, and cabin had been prepared, and in th setting a scene representing the escape of a campe fire and the efforts of fire fighters to save forest a cabin was enacted before a crowd of 2,500 or 3,00 Other features of the week were window displays, fo estry motion-picture showings and a forestry and co servation question contest in the schools, and forest talks before service clubs and Boy Scout troops.

* * *

The study of forestry methods has been introduce in 22 negro vocational schools in Mississippi. See of black locust, loblolly pine, and shortleaf pine hav been distributed to the schools by the State fore service to be planted in seed beds prepared by th students and later to be transplanted to waste land Bronze medals provided by the American Forestr Association are to be awarded to the schools obtainin the best results.

ıck Locust Plantation on Idaho Farm Gives Good Returns

rom 1½ acres of a 27-year-old black locust planta-
on his farm near Wilder, Idaho, Albert Alexander-
obtained a total return of $1,020, Extension
ester A. M. Sowder reports. Mr. Alexanderson
ived $900 for fence posts, which he sold at the
owing rates:

	Each
ts 7 to 8 inches in top diameter, 8 feet long	$1.00
ts 5 to 6 inches in top diameter, 6½ feet long	.25
ts 2 to 4 inches in top diameter, 6½ feet long	.10

he fuel wood, which amounted to 10 cords and
used on the farm, was valued at $120. Mr.
anderson's 50 days' labor in felling the trees
cutting them into posts and cordwood was valued
150. Thus the net return was $870, or $580 per
—which is $21.48 per acre for each of the 27
rs during which the trees had occupied the land.
records were available to show the value of cuttings
le intermittently by previous owners. The timber
by Mr. Alexanderson was a portion of a 17-acre
ntation established in 1901 on blow sand soil with
sery stock purchased at $6 per 1,000 and spaced
y 6 feet. The soil, formerly unfit for agricultural
has been so enriched by the locusts that it is now
eved to be suitable for cultivated field crops.

* * *

ales of white oak poles for harbor piling and hickory
es to be used in ocean fishing have brought returns
6,000 in 18 months to farmers of the Landis com-
nity, Rowan County, N. C., Extension Forester
W. Graeber reports. The contractor buying them
aying the farmers from $2 to $2.50 apiece on the
mp for hickory poles to be used by ocean fishermen
fastening their nets. These poles range in length
m 50 to 100 feet. White oak poles for harbor
ng, the diameters of which usually range from 14
20 inches at the bottom and from 5 to 8 inches at
top, bring from $2.50 to $4 apiece.

* * *

rizes for 4-H forestry club work will be awarded
the Utah State Fair this year, for the first time.
ards of $8, $6, and $4 will be made to the clubs
ibiting the best collections of leaves, twigs, woods,
son plants, range plants, and rocks, and the same
ounts are offered to the winners of a forestry identi-
ation contest.

* * *

The Kentucky Forest Service last year opened to
public at the State fair grounds, Louisville, a per-
nent forestry building, 35 by 55 feet, constructed of
s cut on the State forest. Panels and bromides
re used on the walls and moving pictures of forestry
jects were given at scheduled hours.

Farm Forests Started Along Highways of Southern Idaho

Demonstration farm forest plantings were started in the spring of 1930 at 12 points along main highways of southern Idaho, through cooperation of the farmers, Extension Forester A. M. Sowder, and county agricultural agents. These plantings, designed to develop into farm woodlands, shelter belts, and windbreaks, were made with 1 and 2 year old seedlings of black locust, Russian olive, and Siberian elm. Black locust is favored because of its special merit for fence-post production, but in certain sections of the State its use is restricted by climatic conditions. Where it is not practical to plant locust, Russian olive is substituted. Planted together with Siberian elm this tree makes an efficient windbreak. The trees were placed at intervals of 6 feet in rows 6 feet apart, a spacing that permits horse cultivation for the first two years.

* * *

Requests for trees for planting on Wyoming farms in the spring of 1930 exhausted the State university's supply of 87,000 trees when the planting season was not much more than half over, writes Extension Forester W. O. Edmondson. The trees distributed were 1 to 3 year old seedlings of blue spruce, western yellow pine, American elm, boxelder, Siberian pea-tree, Chinese elm, western choke cherry, cottonwoods, green ash, Russian olive, silver poplar, and willows. Those ordered in greatest numbers were Siberian pea-tree, western yellow pine, and cottonwoods.

* * *

New York's program for Conservation Week, 1930, began with a talk over radio station WGY on April 1 by Governor Roosevelt. Conservation Commissioner Alexander Macdonald and members of his staff were scheduled for radio talks on the remaining days of the week. The Empire State Forest Products Association in collaboration with the New York State Forestry Association prepared a 2-page spread on forest conservation which was distributed to newspapers, fish and game clubs, members of the legislature, and others. The association also prepared and distributed a fire-warning blotter.

* * *

In Caldwell County, N. C., 80 4-H club boys planted 2,000 black walnut trees this spring on waste corners of their home farms. Caldwell County did not receive any of the black walnut trees grown in the North Carolina State nursery, the supply of which was exhausted early in the season, but a citizen of Caldwell volunteered to pay for 2,000 trees from the Alabama State nursery on condition that the club boys agree to plant them and to keep records of their growth for five years.

Forest Service Notes

National Forest Reservation Commission Authorizes Purchase of 422,737 Acres and Approves New Purchase Units

Purchase by the Federal Government of 422,737 acres of land for national-forest purposes at a total cost of $1,201,262 was approved by the National Forest Reservation Commission at a meeting held May 17. This purchase program, one of the largest approved by the commission in recent years, involves lands within 27 different purchase units in 15 States. It provides for the acquisition of 539 tracts at an average cost of $2.84 per acre.

Initial purchases of 58,522 acres and 42,774 acres, respectively, in the Flambeau and Oneida purchase units, in Wisconsin, are included, together with 66,527 acres of land elsewhere in the Lake States. Other large items in the program are 40,120 acres in the Choctawhatchee unit, 29,435 acres in the Osceola unit, and 14,241 acres in the Ocala unit, all in Florida; 33,447 acres in the Nantahala unit, in Georgia, North Carolina, and South Carolina; 30,070 acres in the Ouachita unit, in Arkansas; 26,057 acres in the Cherokee unit, in Tennessee, Georgia, and North Carolina; 16,955 acres in the Monongahela unit, in West Virginia; and 15,944 acres in the Catahoula unit, in Louisiana.

At the same meeting the commission approved the establishment of four new national-forest purchase units, the location and gross areas of which are as follows: The Cumberland unit, 580,000 acres, in eastern Kentucky; the Kiamichi unit, 345,200 acres, in Le Flore and Latimer Counties, Okla., and Polk County, Ark.; the Homochitto unit, 325,000 acres, in southwestern Mississippi; and the Evangeline unit, 75,000 acres, in Rapides Parish, La. No national-forest purchase unit had previously been approved in either Kentucky, Oklahoma, or Mississippi.

Congress Authorizes Appropriations for Purchasing National Forest Land and for Reforesting National Forest Land

An act of Congress approved June 2, 1930, authorizes appropriation of $3,000,000 in each of the fiscal years 1932 and 1933 for purchase of lands for watershed protection and timber production under the Weeks Act as amended by the Clarke-McNary Act. An act approved June 9, 1930, authorizes appropriation of $250,000 for the fiscal year 1932, $300,000 for the fiscal year 1933, and $400,000 for each fiscal year thereafter, for reforesting national forest land planting or seeding. These figures represent increa over the appropriation for these purposes during t fiscal year ending June 30, 1931, of $25,000, $75,0 and $175,000, respectively. This act also gives t Secretary of Agriculture authority to require a purchaser of national forest timber to deposit, addition to the payment for the timber, money cover the cost to the United States of planting seeding the land cut over by the purchaser or t cost of destroying or removing undesirable grow remaining on the cut-over land with the purpose improving the future stand of timber.

Additional Appropriations for Nation Forest Road Building Authorized b Congress

A bill signed by the President on May 5 add $5,000,000 to the amount, $7,500,000, previous authorized for appropriation for national forest roa construction in the fiscal year 1931, and made th same increase in the amount authorized to be appr priated for such use in each of the fiscal years 1932 ar 1933. Permission to obligate the additional $5,000,0 during the fiscal year 1931 is embodied in the secon deficiency bill. An additional appropriation of $3 500,000 for national forest road construction withi the fiscal year 1931 is likewise carried by this bill.

The additional $5,000,000 authorized to be appr priated for each of the three years would preferabl be used in the construction of forest highways tha are projected as parts of the Federal-aid syste This money would be prorated among the States con taining national forests in the same way that lik appropriations have hitherto been apportioned; that i in accordance with the ratio that the area of th national forests in each State bears to the total area o all the national forests and in accordance with the rati that the value of the national forest resources in eac State bears to the total value of the resources of all th national forests, each of the two considerations havin equal weight.

* * *

National forest receipts for the 9-month period ending with March, 1930, were $4,406,981, or $505,052 more than those for the corresponding period of the previous fiscal year. Receipts from timber sales accounted for $397,835 of the increase, and livestock grazing fees showed a gain of $99,487.

ıttered Seed Trees Fare Badly on Cut-over Douglas Fir Lands

'oo many of the seed trees left by loggers on Douglas- ands of the Northwest are dying before they per- n their mission, reports Leo A. Isaac, assistant silvi- urist of the Pacific Northwest Forest Experiment tion. Mr. Isaac's data, obtained through coopera- of forest officers on the Snoqualmie, Mount Baker, cade, Santiam, and Mount Hood National Forests, er seven representative areas of from 30 to 70 acres n on these forests. Losses of seed trees on these s at the time of logging and within periods of from 5 years after logging ranged from 9 to 78 per cent in only two instances were less than 31 per cent.

'he current logging practice on Douglas-fir areas of ional forests in the Northwest is a clear-cutting em that usually leaves not more than 5 per cent of merchantable volume of the stand. The original uglas-fir forests were largely mature, even-aged, very dense stands that did not invite any system of tial cutting. Because the mature Douglas fir is hly resistant to fire damage and is a prolific seeder, because seed dissemination tests in the region have nonstrated that a distance of from 500 to 1,000 feet ween seed trees does not prevent satisfactory eding if the seed supply is adequate, the Forest vice has customarily required only that one or two es to the acre, evenly distributed over the area, be by the loggers as seed trees. This requirement been met largely by leaving defective trees which, ugh worthless for lumber, were capable of producing od seed.

The losses recorded on the seven areas studied were ısed by all phases of the logging operation and by ndfall. Loss in connection with the falling opera- n was found to be very low on all areas studied ept one, where it amounted to 22 per cent. The aviest recorded loss from the skidding operation was per cent. It was common, however, for a seed e to be injured at the base in skidding. When slash fire occurs the pitch face resulting from such injury burns so severely that the tree may be led. With the pitch faces contributing to the verity of the burn, the slash fire usually takes a avier toll of seed trees than either the falling or e skidding operation. On one sample area 20 per nt of the seed trees were killed outright by the slash e and the remaining 80 per cent were all listed as jured; during the three years that followed an ditional 34 per cent died, apparently from fire jury.

The greatest loss attributed to a single cause was at due to windfall. On one sample area 29 per cent the seed trees were wind thrown. Some windfall curs on practically all areas; but loss from this use is heaviest on the better sites, because there the il is more moist, the trees are larger, and the removal of the surrounding timber causes a greater loss of protection.

Suggestions made by forest officers and others for giving the average Douglas fir seed tree a better chance to survive include the following: Locate spar trees in advance if possible and mark no seed trees within 400 feet of them. Also avoid leaving trees close to "high lines." Watch falling and skidding crews and do not permit unnecessary damage. Make an effort to leave seed trees on ridges and exposed places where trees are naturally shorter and more wind firm and where they are less subject to injury from falling, skidding, or slash fire. Do less slash burning, and control it more carefully. When feasible omit slash burning on small areas of low fire hazard, such as steep slopes where most of the débris is dragged into the canyon

A better way of providing for reforestation of cut-over Douglas fir areas will perhaps be found in the "spoke," "strip," or "group" system of leaving seed trees, tests of which have recently been started on various national forests. In general this contemplates leaving the same number of trees as are left under the scattered seed tree system (not more than 5 per cent of the merchantable timber by volume) but permits concentrating them around the edges of settings, on ridges, or at other points where they are less subject to injury from wind, logging, and the slash fire and are more advantageously situated for seed dissemination. The chief objection to this system is that it necessitates leaving greater numbers of sound trees. Mr. Isaac suggests that it might be well to enlarge the groups to a size that would justify coming back at a later date to log them. Blocks of timber so left, besides providing a source of seed for the cut-over area, would greatly reduce the general fire hazard.

Southwestern Forest and Range Experiment Station Created

The Secretary of Agriculture has approved the establishment of the Southwestern Forest and Range Experiment Station with headquarters at the University of Arizona, Tucson, Ariz. This order centralizes the direction of Forest Service research in silviculture and range management in the Southwestern States. G. A. Pearson, who has had charge of the Southwestern Forest Experiment Station, Flagstaff, Ariz., will direct the new station and will be immediately in charge of its silvicultural work. C. K. Cooperrider, heretofore in charge of research in range management and erosion control on the national forests of the Southwest, in his new status as a member of the experiment-station staff will have charge also of the work at the Santa Rita and Jornada Range Reserves. These reserves and the station at Flagstaff will be maintained as branch stations.

Tank Trucks for Fire Suppression on the Angeles National Forest

By W. T. MURPHY, United States Forest Service

With all the time and effort that are being put into the study of forest fire suppression tactics, we can not get away from the primary importance of water as a means of extinguishing fire. In southern California, where water supplies are probably as limited as in any other forest area in the United States, special effort has been made to speed up the development of tank trucks and pumps and of sources of water supply. One of the most notable advances made on the Angeles National Forest in provision for suppressing fires has been the introduction of combination pump and tank trucks.

The start was made by lining up for fire duty as many road sprinkler tank trucks and orchard heater distillate tank trucks as it was possible to get. Provision was made for mounting portable gasoline-operated fire pumps on some of the tanks. Owing to the length of time required to get them mobilized, these tanks could be used only on large fires that had been going for some time. We soon discovered that in order to have water available at the start of a fire and at the time when it would do the most good we should have to acquire our own tank trucks and keep them in constant readiness for use.

Our first tank truck was placed in commission during the summer of 1928, and has been in regular service ever since. This truck is a 2½ ton model carrying an 850-gallon-capacity water tank equipped with a secondary transmission. An Edwards rotary gear pump driven from the truck motor by means of a power take-off and a chain drive serves as the primary pump unit. This pump has a capacity of about 100 gallons per minute and delivers pressure of about 150 pounds for ordinary working conditions. The equipment on the truck consists of 900 feet of 1½-inch rubber-lined cotton-jacket hose, a Ross portable pump, and a monitor nozzle mounted on the tank itself for service along the roadside. An added feature is that the tank and hose drawers can be detached and ordinary stake sides placed on the truck, making it a general utility truck for winter service. This first truck has a number of serious disadvantages. It is too heavy to make good speed on the highway, because we are trying to carry too much water in it and because the convertible feature makes it necessary to carry a heavy flat platform under the tank; also the pump, being on the outside of the truck frame, is apt to be torn off in the event of an accident. In constructing our next truck we endeavored to eliminate these disadvantages as far as possible.

The second Angeles tank truck, placed in commission in October, 1929, is considerably smaller than the first. It carries only 450 gallons of water, but is equipped with 10 back-pack pumps of 5-gallon capacity each; shovels, 6 axes, a telephone, a first-aid kit, anc Coleman lanterns, none of which are carried on first truck. Other equipment carried includes a with 300 feet of 1-inch noncollapsible hose, 400 feet 1-inch collapsible hose, and 600 feet of 1½-inch rubb lined hose, and a Ross portable pumper. On this tru also, the pump unit is an Edwards pump, the o difference being that the pump is mounted under truck seat instead of on the outside of the truck fra This later truck develops 56 horsepower and wh loaded weighs about 15,000 pounds. It is equipp with a secondary transmission.

The first Angeles Forest tank truck has paid itself several times over. In 1929 alone it sav $6,500 worth of improvements and in three instan prevented the development of what threatened to b very serious brush fire, as well as cutting down the c of suppression on four other fires. On one fire o one-half acre in size a mopping-up job for which fo man-days would ordinarily have been required w performed in three hours by means of the tank truc On the one fire on which the second tank truck has be used it gave a very good account of itself by reduci the mopping-up and patrol costs as well as insuri complete extinction of the fire during a period of ve low humidity.

Nine tank trucks are now being operated in L Angeles County—2 by the United States Forest Servic 6 by the Los Angeles County Forestry Departmen and 1 by the Los Angeles County Park Departmen The present summer will probably see this numb raised at least to 13.

The tanks have proved most effective in reduci the time required for patrol and mopping up and controlling incipient fires. The use of the tanks appea to lighten considerably, also, the task of controlli back-fires set along roads. We expect that as acquire more of these tank trucks we shall become mo proficient in their use and the importance of the place in our fire-suppression work will constant increase. Experience gained in the use of the truc will probably enable us to make each truck we develo an improvement over its predecessors; next time plan to substitute a 2-stage centrifugal pump for t rotary gear pump, to use a truck with 70 to 80 hors power rather than one with 56 horsepower, and to u a light double-jacket hose capable of standing under pressure as high as 400 pounds.

* * *

The Secretary of Agriculture has approved the su stitution of the words "region" and "regional" for th word "district" as applying to the nine areas into whic the United States is divided under the national fores administrative plan and to the titles of field officer of the Forest Service. The change became effecti May 15.

orse and Trail Grader for Fire-Line Construction

V. J. Brokenshire, forest ranger on the Lassen tional Forest, Calif., tells how the horse and trail der rendered effective service last year when he called to fight a fire on State-patrolled land on vis Mountain. The fire occurred in fairly open tern yellow pine and Douglas fir type, at an eleva- n of 3,200 feet. The ground cover was of litter, aw carpet, and brush, with some reproduction. e fire had covered about 800 acres when the ranger three other men arrived with tools, horse, trail der, and kerosene torch. The use of the trail der enabled the small crew to make a fire line with- the delay that would have been involved in getting ether a larger crew. This saving of time enabled crew to back-fire with the Hauck torch when condi- ns were favorable. Two men with horse and trail der constructed 4 miles of fire line, making two trips r the line, at a rate averaging about 1 mile per hour. rt of the line had to be fired as soon as it was plowed; remainder was fired at night. While one man back- d with the torch another cleared out the trail in ces which the trail grader had missed and two men trolled the line, one on horseback and one on foot.

The cost of this line, aside from the back-firing, was 39 per mile; according to experiments carried out at California forest ranger school, if constructed with vels, McLeods, and rakes in similar country it uld have cost $11.50 per mile. There was an addi- nal saving in cost of supplies and transportation.

The fire was controlled when it had burned approxi- tely 1,000 acres.

oison Proves Effective Against Pine-Destroying Ants

Ants identified as Cremastogaster lineolata var. and pinoma sp. which have given trouble in nursery ds and seed-spot plantings on the Choctawhatchee tional Forest, Fla., by cutting off and carrying ay the cotyledons of newly germinated pine seed- gs, have been successfully poisoned with preparations pplied by the Bureau of Entomology. To make ese preparations 2 pounds of sugar and 8 ounces of ney are dissolved in a quart of boiling water and her 60 grains of thallium sulphate or 125 grains of dium arsenate is dissolved in the sirup while it is ll hot. The thallium sulphate preparation was found e more effective. Bran soaked with the poison is aced at intervals among nursery beds or among seed ots in the field. The poison appears to be effective r a period of 10 or more days after each application.

These ants have very little preference among the rious species of southern pine, according to observa- ons of Assistant Silviculturist Eugene W. Gemmer, it appear to cause more damage to longleaf than to some other species. The recovery of pines attacked by them depends to a considerable degree on the pines' stage of development at the time of attack. If the radicle has made a firm contact with the soil, the chances of survival are good. The stem remains green and after two or three weeks' delay primary needles burst through the wound tissue at the top of the stem. From that stage on, development is normal. The injured seedlings may not, however, succeed in catching up with those that have escaped injury.

The stems of seedlings are seldom attacked by the ants, even if they are growing immediately adjacent to the nest; but if the nest is a large one it may bury seedlings and in this way cause their death.

Portable Radio Sets Undergoing Test on Columbia Forest

Nine portable radio sets weighing, with batteries, about 50 pounds each, are being tried out this summer on the Columbia National Forest, Wash., as a means of keeping trail-construction camps in communication with forest headquarters. Back of this experiment is nearly three years' study by D. L. Beatty, of the Missoula, Mont., office of the Forest Service, of the possibilities of radio as a means of forest protection. Because trail-construction crews move camp frequently they are often beyond the reach of telephones when needed for emergency duty on the fire line. These portable radio sets, light enough to be packed on a horse, promise important service in making trail-construction crews and other detached units readily available when trained fire fighters are needed.

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In the northern national forest region, which centers in Montana, plow units are to be purchased with $20,000 of the $54,000 increase in appropriations for personnel and fire equipment allotted to the region for the fiscal year 1931. A plow unit includes plow, horse, harness, packsaddle, and a truck to transport horse and plow as close as possible to the point where the fire line is to be made. On any area where rockiness or hilliness does not preclude the use of this equipment, national forest officers have found, 2 men with a plow unit can match from 10 to 50 men with hand tools in fire-line constructing efficiency.

* * *

Smoking is restricted this summer on the national forests of Washington and Oregon. Regional Forester C. J. Buck has ordered that "except on paved or surfaced highways, smoking on lands of the United States within the national forests of Oregon and Washington is prohibited while traveling in timber, brush, or grass areas from July 1 until the close of the fire season as declared by the regional forester, but not later than September 30."

A Device for Rationing Water to Nursery Stock

A method of determining how much water must be applied to nursery beds to counteract evaporation is described by Junior Forester C. W. Corson, who has employed it with success at the Susanville nursery, Lassen National Forest, Calif. Mr. Corson used two tin cans, so constructed that one fit inside the other. The outer can was 5 inches in diameter and 14 inches deep; the inner can was 4 inches in diameter and 12 inches deep, had perforations in the bottom, and had a rim around the top which held it clear of the outer can and prevented water from entering the latter otherwise than through these perforations. The outer can was set in the ground at the nursery, its top flush with the surface. The inner can was filled to its top with soil taken from the hole. The quantity of water applied to the soil in the can at a given watering was determined by weighing the soil-filled can before and after the watering. The quantity of water that evaporated from the soil in a day was determined by comparing the weight of the canful of soil after one day's watering with its weight before the watering of the next day, allowance being made for any water that seeped from the inner to the outer can.

Seedlings grew very well in beds to which Mr. Corson applied daily a little more water than was shown by this test to evaporate from them.

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Recent tests of a shipment of second-growth Douglas fir at the Forest Products Laboratory disclosed that the specific gravity of the wood was lower than that of virgin-growth Douglas fir from the same region contained in a similar shipment. The difference amounted to about 13 per cent of the specific gravity of the second-growth wood. In both large and small second-growth trees the specific gravity varied considerably from center to circumference; the heaviest wood was found in the last 20 years' growth on the smaller trees. In rings formed during this period the proportion of summer wood was greater than in rings formed during the earlier years of the second-growth trees.

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Applicants for admission to the next forest ranger examination given by the United States Civil Service Commission will be required to show that they have had at least three years' experience in forestry work such as lumbering, range management, surveying, and forest fire control. At least six months of this experience must have been in a foreman's position or a similar position involving the direction and control of three or more men. College work in forestry or range management will be accepted in lieu of experience, other than foremanship, up to a total of 27 months. The next forest ranger examination will be held in the fall of 1930.

Timber on the Chippewa National Forest, Minn that was previously considered unmerchantable being used by a mill newly established at Cass Lak Minn., as material for railroad-tie plugs. These plu are made to be driven into holes left by the remov of spikes from railroad ties when the ties are change from their original positions. They prevent th entrance of water and tend to reduce the rate of deca Several million such plugs are used annually on rai roads in the Lake States. The mill at Cass Lake mak the plugs from American elm, sugar maple, and balm of-Gilead poplar and from the tops of better har wood species. The mill has a capacity of 1 carloa of plugs a week, employs 8 men, and uses about 2 cords of wood a week.

❧

Federal forest planting in Wisconsin began in Ma 1930, with the planting of 2–0 Norway pine on 51 acres of the Moquah unit, within a month after tit to the land had passed to the United States. On 15 acres the trees were planted in furrows; on the r maining area, which was burned over last fall, the were spot planted. All but 80 acres of this plantin project is bounded by county trunk highway C.

❧

Examinations of 435 sprouts 2.5 inches or less i breast-height diameter chosen at random on po tions of the Bear Pen timber sale area, Ozark Nation Forest, Ark., showed that 29 per cent of the sprout were affected by stem rot, the Central States Fore Experiment Station reports. Of the white oak an black oak sprouts examined more than 33 per cen were so affected. As a result of repeated fires th forest reproduction on this forest is practically a sprout growth. Many of the sprouts now present ar growing from rootstocks a great deal older than them selves, several preceding generations of sprouts fro the same rootstocks having been destroyed in tur by fire.

❧

Forest plantations established in the spring of 192 on the Kaniksu National Forest, Wash.-Idaho, and th St. Joe National Forest, Idaho, came through a fir year of unusual droughts with a percentage of surviv that is excellent for that region. At the Priest Rive Experiment Station, 15 to 30 miles from the Kaniks projects, the total precipitation during July, Augus and September was 0.72 of an inch, 3.30 inches belo normal, and at Wallace, Idaho, 10 miles from the S Joe project, the precipitation for these three month was 1.02 inches, 3.50 inches below normal; yet at th end of the season the plantings, which were of wester yellow pine, western white pine, western red cedar, an Douglas fir, showed an average survival of 74 per cen

cretary Hyde Willing to Agree to
Construction of Cableway on Mount
Hood

ecretary of Agriculture Hyde has announced that he
villing to authorize construction of a tramroad and
leway on Mount Hood, Oreg., under certain con-
ons safeguarding the beauty of the site. (The
unt Hood area is included within the Mount Hood
tional Forest and is almost entirely Government-
ned.) He would require that the construction
ract as little as possible from the enjoyment of
tors reaching the area by other means, and would
uire surety that if the project became so objection-
e as to call for discontinuance the site would be
sfactorily restored to its former condition.

Preparatory to deciding on the question as to con-
uction of a cableway and on other proposed develop-
nts on the Mount Hood area Secretary Hyde
uested the advice of a committee composed of John
Merriam, president of the Carnegie Institution of
shington, D. C., Frederick Law Olmsted, landscape
hitect, and Frank A. Waugh, professor of landscape
ineering at the Massachusetts Agricultural College.
ese men made a study of the Mount Hood region
he summer of 1929. They found greater charm in
timber-line region of the area, with its spurs and
es, diversification of tree growth, and mountain
adows, than in the less accessible peak and the
ws obtainable from the peak. Moreover they
med the opinion that the attractiveness of the
ber-line region would be greatly diminished by the
struction of a cableway. For these reasons two
nbers of the committee do not approve the con-
uction of the cableway. In deciding with the
ority of his committee Secretary Hyde cites the
t that the proposed tramroad and cableway can be
nced immediately by private capital, whereas
elopment of the timber-line region with roads,
ls, camp grounds, and shelters could be carried
only at public expense and is not yet provided for
Congress. He states, also, that the majority of the
ple of Oregon are in favor of the project.

orest Products Laboratory Identifies
Ancient Wood

piece of a 7-foot tree buried 150 feet below the bed
the Yakima River and estimated to be 12,000,000
rs old was recently identified at the United States
est Products Laboratory as a species of Sequoia.
e wood specimen, taken from a log encountered in a
ited States Reclamation Service tunnel being driven
ler the Yakima River between Ellensburg and Cle
m, Wash., was sent to Arthur Koehler, wood iden-
ation expert of the Forest Products Laboratory, by
n P. Thomson, of Ellensburg. According to Mr.
omson the tree was found in solid basalt believed to
have been poured out of one of the Columbia Plateau volcanoes 12,000,000 years ago.

"The wood is too friable to be sliced thin for microscopic examination, but examination of the whole piece with a hand lens leaves no doubt of its close kinship with Sequoia sempervirens, the redwood of to-day," reports Mr. Koehler, who adds:

> The redwoods have not always been confined to a narrow strip in California but throve at one time throughout what is now the United States, Canada, Alaska, Greenland, Europe, and Northern Asia. Fossil sequoia cones were found in rocks and swamp deposits in Europe in the nineteenth century before the only living representatives of the species were known to the white man.

* * *

When transplant stock in the Wind River Nursery, Columbia National Forest, Wash., was dug for shipment in 1929 it was found that 91 per cent of the Douglas fir and 96.4 per cent of the western yellow pine originally transplanted were living and in condition suitable for shipment. The Douglas fir, western yellow pine, and noble fir planting stock shipped from the nursery in 1929 was produced at an average cost, for all classes, of $6.82 per 1,000. For 2–0 Douglas fir the cost was $3.76 per 1,000; for all classes of Douglas fir the average cost per 1,000 was $6.72. The nursery's output for the year totaled 1,273,766 trees, of which 84 per cent were Douglas fir, 11 per cent were western yellow pine, 4 per cent were noble fir, and the remainder (less than 1 per cent) were of miscellaneous species.

* * *

Sunset Crater, an extinct volcano on the Coconino National Forest, Ariz., has been made a national monument. A presidential proclamation of May 26, 1930, sets aside an area of 3,040 acres including the crater and neighboring volcanic formations. The crater is 16 miles from Flagstaff, Ariz.

* * *

Deer have decreased by 2.8 per cent on the national forests of Montana and northern Idaho in the past five years, according to estimates of forest officers. Of the kill of deer in that period 41.5 per cent has been taken by hunters, the remainder being due to predatory animals and other causes. Elk are estimated to have increased 60.3 per cent, moose 39 per cent, black bear 5.1 per cent, grizzly bears 13.6 per cent, mountain sheep 15.6 per cent, and mountain goats 53.5 per cent. For all fur-bearing animals an increase was indicated; otter showed the highest gain, 43.3 per cent. Game birds decreased markedly.

* * *

Motor parties wishing to camp on national forests of region 1 will hereafter be granted camp-fire or special-entry permits only on condition that each party carry with it ax, shovel, and folding pail.

General Forest News

Clearwater Timber Co. Practices Selective Cutting

The Clearwater Timber Co., of Lewistown, Idaho, expects to cut about 110,000,000 board feet of timber from its 225,000 acres of timberland in each of the next 25 or 30 years; then, after a wait of 5 or 10 years, it expects to begin cutting from the same land another timber crop as heavy as the present one. The operation began in 1927. The timber is 55 per cent western white pine. The company has 1,000 men at work in the woods and employs 900 men in its mill, which produces 150,000,000 board feet of lumber a year. In the interval between the completion of the present cut and the beginning of the next the company hopes to keep its plant and force busy through the purchase of timber on some of the 700,000 or 1,000,000 acres of timberland other than its own that can be reached through the Clearwater drainage.

On second-growth areas the company is cutting to a diameter limit averaging 17 inches, removing only 60 or 65 per cent of the total volume of standing timber. On some old-growth areas it is cutting in such a way as to save reproduction; for the most part, however, it is clear cutting its old-growth timber, logging with power and burning the undergrowth so as to clear the way for natural reforestation. E. C. Rettig, the company's chief forester, explains the latter practice on the basis that the big logs and steep grades make horse skidding impractical and that the reproduction under the old stands is so defective as not to promise good development even when released from suppression.

Some of the second-growth timber which occupies about three-fourths of the company's acreage is 120 years old. The old-growth timber, all of which is at higher altitudes, ranges from 200 to 400 years of age.

Most of the areas that are being logged are at elevations of from 1,200 to 4,500 feet.

Trees to be cut are blazed once at breast height, so that the sawyers can see the mark even if deep snow is on the ground, and once below the stump line to permit a check on the cutting. In the experimental stage this marking cost not more than 5 cents per 1,000 feet, and it was expected that the cost would later be reduced to 3 cents per 1,000 feet.

At present all slash is being burned; but other slash-disposal methods, including partial burning followed by fire patrol, are being tested.

In cooperation with other members of the Clearwater Timber Protective Association and with the Bureau of Plant Industry the company is eradicati Ribes as a protection from white pine blister rust.

The chief executive of the Clearwater Timber Co. J. P. Weyerhaeuser, jr. The assistant general manag is C. L. Billings, formerly in charge of the office forest products in the Missoula, Mont., district offi of the United States Forest Service.

Parasite Rapidly Reduces Tip Mot Work in Halsey Plantations

Tip-moth infestation of western yellow pines in t Halsey plantations, Nebraska National Forest, h strikingly decreased since the introduction in 1925 the parasite Campoplex. In the fall of 1929 L. Baumhofer, entomologist in charge of this wor found that in the center of the plantation where t parasite was first liberated in 1925 approximately per cent of the tip moths were parasitized, 80 per ce of them by Campoplex. From this central poi parasitism gradually decreased until at the edge the plantation, 4 or 5 miles away, it was approximatel 35 per cent. In the central portions of the plantati the number of infested tips, particularly of infest terminals, has decreased enormously; Mr. Baumhof estimates that the proportion of infested termina dropped from 90 per cent in 1925 to 33 per cent 1929. Here the appearance of the trees has chang markedly in the past two years. Already many tre are assuming normal erect form instead of the chara teristic bushy shape which they had taken on as result of heavy tip-moth infestation. Many of t present leaders on these trees of retarded developme are exceptionally sturdy and unusually long for region of only 16 inches average annual rainfall.

Two or three years more should show conclusivel whether or not the parasite can be entirely relied o for control of the tip moth in these plantations.

* * *

The Carlsbad National Monument, N. Mex., ha become the Carlsbad Caverns National Park, under a act of Congress approved May 14. The act provide that the President may by proclamation add to th park as much as 193 square miles of surrounding publi domain lands. The surface boundaries of the nation monument took in but 719 acres, although the cave extend for many miles underground. The Department of the Interior will make a study to determine ho much land should be added to the park to provid adequate surface protection for the caves.

Silver Nitrate as a Seed Disinfectant

By HENRY I. BALDWIN, Brown Co., Berlin, N. H.

'ollowing up seed-disinfection experiments described the March, 1929, number of the FOREST WORKER, which northern white pine seed dusted with Bayer's odust showed increased germination, I have made a liminary trial of silver nitrate as a preventive of ld development on seed of the red spruce (*Picea ra*). Experiments in which silver nitrate was nd effective in keeping wheat seed free from fungi l bacteria during germination have been recorded by eral workers.[1]

My tests were made on individual Jacobsen germinas arranged as follows: A knitted cotton pad, with k attached, was supported over the top of a largeuthed liter bottle by means of a perforated glass k. The seed were placed on a filter paper resting the pad, and covered by a special germinator bell having a perforation at the top. To prevent the ss parts from slipping on one another desiccator ase was used. There was thus no metal in the paratus, and the glassware could be rendered emically clean. The seed, in small cloth bags, were rely soaked in the solutions for 15 minutes and ced in the germinators without rinsing. Neither er papers nor wicks were changed during the periment. In each treatment 200 seed were used.

While too meager to permit of definite conclusions, data obtained seem to indicate that silver nitrate ds considerable promise as a disinfectant for use in ting tree seed. After 40 days no mold had apared on the samples treated with N/1,000 $AgNO_3$, ereas samples soaked in water or in weaker solutions silver nitrate were badly infected. Seed soaked in tilled water were very badly infected with mold m the twentieth day and after 40 days were comtely covered with mold; seed soaked in N/100,000 NO_3 were completely covered with mold from the eenth day; and seed soaked in N/10,000 $AgNO_3$ were ghtly molded after 15 days and very badly molded er 40 days. Up to 20 days, results indicated that er nitrate had a retarding effect on germination; at end of that period the average percentage of gernation was 71.5 for seed soaked in water and 66.5 seed treated with N/1,000 $AgNO_3$. At the end of 30 ys the average germination percentage of the control of seed was 77.5 and that of the lot treated with 1,000 $AgNO_3$ was precisely the same. For these two s the average percentages of full seed germinating re 81.5 and 83, respectively.

While $AgNO_3$ is a fairly expensive salt, the quantity required to make up dilute solutions for treating small lots of seed is almost negligible.

Tests are in progress with other substances that may prove helpful in eliminating from experimental seed testing the very disconcerting irregularities caused by mold infection.

Groves, J. F.: Temperature and Life Duration in Seeds. Bot. Gaz. 169–189, 1917.

hröder, H.: Die Wiederstandsfähigkeit des Weizen- und Gerstenhes gegen Gifte und ihre Bedeutung für die Sterilisation, 2 Abt. tralbl. f. Bakt. 28 : 492–505, 1910.

— Über die selecktiv permeabele Hülle des Weizenkornes. Flora 186–208, 1911.

Entomologists Seek Pine Beetle Control Method That Will Spare Predators

In preliminary experiments carried out in 1928 and 1929 on the Modoc National Forest, Calif., Federal entomologists have sought to develop a method of western pine beetle control that will spare the clerids, principal insect enemies of the western pine beetle. At present, efforts to control the western pine beetle usually take the form of burning the infested trees or peeling the bark from them and sun curing it. The burning method and, to a less degree, the bark peeling and sun curing method both have the undesirable effect of destroying the predators. A second purpose of the experiments was to devise a control method that, unlike burning, could safely be used in summer.

The method tried was designed to take advantage of the fact that the clerids are motile, while western pine beetle larvæ have practically no power of locomotion. It consists in cutting infested trees and exposing the unpeeled logs to sunlight.

It was found that in the unpeeled bark of logs exposed to direct sunlight on moderately level sites or on southerly slopes temperatures fatal to advanced broods of the western pine beetle are reached when the air temperature goes above 90° F. Bark temperatures ran as much as 32° F. above air temperatures. The difference between bark temperature and air temperature was found to be much greater in the case of an infested log that had lost a considerable part of its moisture than in a fresh green log. No evidence of mortality among the clerids was found even where the bark temperatures were highest. Living clerid larvæ were found in bark in which all the western pine beetle larvæ were killed. The mortality of western pine beetle larvæ in the lower portions of the exposed logs was usually greater than that in standing infested trees, probably because of less favorable temperature and moisture conditions and because of the concentration of clerids driven from the upper portions of the logs by unfavorable temperatures.

This method of control, which will be the subject of further experimentation, is applicable only to trees harboring the summer generation of pine beetle larvæ. Its application is limited, also, to fairly open stands on moderately level sites or southerly slopes where the bark temperature of the upper portions of exposed infested logs will reach well over 100° F. Such conditions are found over large western yellow pine areas in southern Oregon and northern California.

Senate Committee to Study Wild Life Problems

A special committee of the United States Senate has been appointed to investigate matters pertaining to the conservation and replacement of wild life. The committee has been instructed to report as soon as possible, and not later than the beginning of the first regular session of the next Congress, its findings from a study of this subject and its recommendations as to any changes or additions which may in its judgment be required by the existing laws pertaining to wild-life conservation in this country. Senator Walcott is chairman and Senator Hawes vice chairman. The other members of the committee are Senators Pittman, McNary, and Norbeck. The committee has chosen as its secretary Morris Legendre, a Princeton graduate who was a Rhodes scholar and who has had wide experience in studies of wild life.

Water Users Conference Urges Measures for Watershed Protection

The First National Water Users' Conference, held at Reno, Nev., February 26–28, 1930, under the sponsorship of the American Farm Bureau Federation, adopted the following as one of its resolutions:

> Whereas overgrazing, fire, destructive logging, rodents, and other factors have already caused material depletion of plant cover to an extent that there is sudden run-off and erosion on watersheds and already storage reservoirs and streams used for irrigation are being filled with silt at an alarming rate; and
>
> Whereas much of this depletion of plant cover and erosion is due to the uncontrolled use of the open public domain; and
>
> Whereas extensive study is needed to fully understand the causes of erosion, develop methods of controlling erosion, and determine the relationship of plant cover and its use to water conservation, which study the several States are unable to make individually without excessive cost and inefficient duplication: Now, therefore, be it
>
> *Resolved,* By the representatives of the water users of the 11 Western States assembled in meeting under the auspices of the American Farm Bureau Federation, at Reno, Nev., February 28, 1930, that we recommend and urge a nation-wide policy in the handling of the public domain that will primarily and completely protect against erosion and conserve the watersheds of the irrigation farmer of the West; and be it further
>
> *Resolved,* That we urge and recommend a full study by the Federal Government of the amount and rate of silting of all irrigation streams and reservoirs in the West; and be it further
>
> *Resolved,* That we urge and recommend the carrying out in full of the research work in forest protection and management and range management on watershed lands as authorized by the McSweeney-McNary Research Act approved May, 1928, and be it further
>
> *Resolved,* That we urge sufficient appropriation for investigating the causes of erosion, methods of preventing and controlling erosion, and the extent to which forest, chaparral, and other vegetative cover on mo tains or other nonarable lands influences the conser tion of the water supply and the regularity of stre flow and prevents erosion, in order to conserve wa for irrigation and to aid agriculture.

Vegetational History of Dismal Swar Traced Through Analysis of Poll Preserved in Peat

A study made by Ivey F. Lewis, Miller profes of biology in the University of Virginia, and Elton Cocke, graduate student, has traced the vegetation which peat in the Dismal Swamp owes its orig This was done by identifying some of the preserv pollen grains and other spores that occur in the peat great abundance.

It was found that when this area first became suita for the growth of land plants it was a grassy swan probably an open meadow type. Invasion by tr followed as the land was built up, so that the mead passed over into a savannah dotted with copses of pi willow, hickory, and red gum. As a forest was beco ing established at a level 8 feet below the present surf some great catastrophe overtook the vegetation, p sibly owing to submergence of the land. This was f lowed by a great reduction in or even a compl disappearance of the trees, accompanied by a ret of grasses and sedges. After this check to the norn vegetational succession, which showed itself m sharply at 7 feet, the forest returned and gradua came to dominate the area as it now does. A seco check of a relatively minor nature occurred at 4 fe This was followed by an unbroken advance toward t closed forest type now dominant. The trees now m abundant in the swamp are black gum, red gu southern white cedar, red maple, southern cypre and pond pine.

* * *

A $3,298,000 purchase has brought into Governme ownership about 13,000 acres of privately owned la within and adjacent to Yosemite National Pa The expense of the purchase was shared equally by t Federal Government and John D. Rockefeller, The lands thus purchased contain fine stands of su pine and western yellow pine. They have been add to the park by presidential proclamation.

* * *

The possibility of two plants being produced fror single seed has been proved in the botanical laborat of the University of Southern California, Scier reports. Mrs. Tema Shults Clare, a teaching fello in two instances obtained pairs of twin seedlings fr Torrey pine seed and in one instance obtained tw seedlings from a piñon seed.

A revision of the white pine blister rust quarantine ulations effective June 5 adds to the list of States d counties designated as infected with the blister st the State of Montana and the parts of Oregon t previously designated. Surveys during the past ar have revealed the existence of infection in north-stern Montana and southwestern Oregon.

⁂

The Everglades in the Cape Sable region of Florida suitable for preservation as a national park, in the nion of a committee that recently examined the a for the Secretary of the Interior, and the Secretary s announced that he will recommend the area to ngress for approval as a national park project. The Cape Sable region is 50 miles nearer the equator than any other section of the United States. The committee made their inspection by dirigible and by motor boats and skiffs.

⁂

William H. Walker, Greenwich, Mass., has a sawmill that has been operating continuously on the same site for 100 years. Its timber supply has come chiefly from a tract of 2,000 acres that has been conservatively handled by the Walker family during this entire period. Selective logging is practiced with the idea of favoring the young growth and of producing large trees of high quality. Portions of the land have been cut over several times in the last century.

Foreign Notes

vedish Institute Finds Autumn Unfavorable Season For Sowing Pine Seed

In order to study the results from fall sowing as npared with spring sowing of pine seed in Sweden, e Swedish Institute of Experimental Forestry made perimental sowings in each of the 10 years 1912–21. Most of the sowing was done in three places osen as representing different latitudinal divisions the conifer-forest region of Sweden north of the nge of oak. The most southerly of these is situated 60° 45′ north latitude in the State forest of Ovansjö, ovince of Gästrikland; the second, at 62° 58½′ rth latitude in the State forest of Oxböle, Province Jämtland; and the most northerly, at 65° 47′ rth latitude in the State forest of Alträsk, Province Norrbotten. These areas are cleared land on which xed pine and spruce forest previously grew. Their ound cover at the time when they were prepared for wing consisted mainly of mosses and berry bushes. e soil is composed of morainic materials with podsol ofile, overlaid with raw humus of rather good ality. It represents Swedish forest soil of about erage type or possibly somewhat above the average.

The method followed was to sow in previously epared seed spots. All sowings were made with otch pine, a fixed number of individual seed being ed on each seed spot. Because of the length of ne covered by the experiment and of the different itude of the sowing areas, it was necessary to use different lots of seed; in each of the 10 years, wever, the fall sowing on each site was made with ed of the same lot used there in the spring planting that year.

Spring sowings showed very much better results an fall sowings either of the same year or of the eceding year. The superiority of the spring sowings s apparent both in the percentage of the seed that germinated, in the average number of plants per spot, in the percentage of seed spots with seedlings, and in germination percentage based on the estimated number of fertile seeds. An examination made in 1926 showed that, in general, results were four times as good on spring-sown as on fall-sown plots on the most southerly area, three times as good on the area occupying a median position, and twice as good on the most northerly area.

In most cases the average of the tallest plants on each seed spot was found in 1926 to be somewhat greater for spring sowings than for autumn sowings of the preceding year. This is attributed to the fact that a considerably greater total number of plants resulted from spring sowing than from fall sowing of a given number of seed, increasing the chance of obtaining trees larger than the average.

Collating these results with those of experiments made by the institute with seed spotting at different times during the summer half-years of 1922 and 1923 at Siljansfors, Province of Dalarne, Edvard Wibeck, director of the Norland branch of the Swedish Institute of Experimental Forestry, finds that in Sweden optimum results from sowing pine seed are obtained by sowing during spring and midsummer. He states that in the north and east portions of Sweden, where summer rainfall is less plentiful and occurs later than in the south and west, the best time for sowing pine seed is at the end of June or even in the first part of July.

While stating that the combination of causes which determines the relative results from spring and fall sowing is too complicated to permit of analysis by means of the rough and ready method of investigation that field sowings and meteorological observations provide, Wibeck refers in this connection to germination experiments previously carried out by K. Wiström with four lots of pine seed described as follows: (1) Seed neither treated with water nor frozen; (2) dry seed that had been exposed to a temperature of between −5° and 17° C.; (3) seed frozen like the second lot but after being about half saturated with water (its weight being increased by about 20 to 30 per cent as a consequence of soaking for from two to three hours); and (4) seed treated like the third lot but having been fully saturated with water by about six hours' soaking, showing an increase in weight of about 45 to 65 per cent. A 30-day germination experiment indicated that the fertility of the seed samples of lots 2 and 3 was about 70 to 90 per cent as great as that of the untreated seed and the fertility of the seed of lot 4 only 37 per cent of that of the untreated seed. The great decline in fertility shown to take place in pine seed frozen in a very moist state, Wibeck observes, is quite sufficient to explain why autumn sowings are generally inferior to spring sowings in respect to the proportion of plants that come up, since it is evident that autumn-sown seed is generally far more exposed to soaking and freezing before germination than spring-sown seed.

Reforestation Costs in the French War Zone

Bids for the reforesting of 7,000 hectares in the devastated zone near Verdun and Morthomme in France resulted in the placing of the contract at the following rates (specifications call for 4,500 plants to the hectare):

	Francs per hectare
Half black pine and half Scotch pine	1, 127. 68
Half spruce and half hardwoods	814. 56
Half black pine, one-fourth birch, and one-fourth white alder	983. 85

* * *

Reforestation operations costing from $450 to $1,000 per acre are in progress on denuded mountain sides of Korea, according to information supplied by Japanese foresters of the Korean Forest Experiment Station to Leon M. Estabrook, commissioner in the foreign service of the United States Department of Agriculture. The washing and gullying of vast mountain sides with slopes ranging to 30 per cent is causing enormous damage to river bottoms valuable for agriculture. "Nursery spots" are prepared on the eroded areas by planting herbaceous plants. When the nurse crop is several years old a pine tree is planted on each spot.

* * *

Shipments of cork from Algiers to the United States, which receives a greater portion of the annual export of Algerian cork than any other country, in 1929 totaled 47,280 tons and were valued at $3,095,320. Shipments from the Palermo district of Sicily to the United States totaled 5,810,000 pounds in 1929 and 2,609,000 pounds in the quarter ending March 31, 1930.

American Forest Trees Popular in Sou Australia

In South Australia, where Monterey pine is the t most used for forest planting, a number of other Ame can conifers are popularizing themselves, according the report of the South Australia Woods and Fore Department for the year ending June 30, 1929. R cent tests with loblolly pine and slash pine have giv results such as to convince forestry officials that future plantings these species may well be substitut in large measure for Monterey pine. Maritime pine expected to join with these two American species partially displacing Monterey pine. Douglas fir is me tioned as having given good results in recent tests, a Bishop pine is reported to be displaying remarkal growth in deep sands at high elevations. Seed used forest nursery sowings made in June of 1929 included 1 pounds of loblolly pine, 92 pounds of western yellow pi and 50 pounds of longleaf pine.

Monterey pine, popular in South Australia for mo than 40 years, was used on 5,620 acres of the total ar of 6,069 acres reported by the department as havi been planted in the fiscal year 1929.

Forest Fires in Bulgaria

Forest fires in Bulgaria are frequent and disastro especially in the coniferous forests that abound in t mountains of that country, according to a Gover ment report of which the Geneva Geographical Socie has published a review. Most of the fires are attribut to carelessness; some are of incendiary origin. Rovi herders who spend the summer in the mountains fr quently set fires of great extent with the purpose creating new pasturelands. Great areas of forest Bulgaria are said to have been destroyed by fi spreading across the Turco-Bulgarian frontier. Burn over areas on the Bulgarian State forests aggrega 17,200 hectares. From 1924 to 1928, 6,000 hectares Bulgarian land was artificially reforested. A law 1925 provides for safeguards against forest fires and f forest-fire suppression, but there is still need for mo strict enforcement of this law and for the developme of greater public consciousness of the importance forests to the whole country. Last summer Ki Boris himself took a hand in fighting fire on the fores of Tcham-Koria. Armed with an ax, the soverei placed himself at the head of a group of soldiers a others and actively led them in cutting trees and clea ing a firebreak.

* * *

British Columbia has recently increased the fore protection rate which it levies on lumber operatio from 2¼ to 4 cents per 1,000 feet, and has raised t Government contribution to the protection fund fro $200,000 to $480,000.

Personals

V. F. Ramsdell, assistant regional forester of the ited States Forest Service in the Lake States region, resigned to accept appointment to the George lis Pack professorship of forest land management he School of Forestry and Conservation, Univer- of Michigan. This professorship, maintained h part of the income from a foundation established Charles Lathrop Pack in memory of his father, as its purpose the promotion of practical forest d management through woods work rather than ssroom instruction. Mr. Ramsdell received the S. and M. F. degrees from the University of Mich- n in 1912 and 1914, respectively. He entered the est Service as a student assistant, and had served seven different national forests in the West when 1924 he was made inspector in forest management the North Pacific region. He was assigned to the ke States regional office when it was first organized May, 1929.

. R. Watzek, of the Crossett-Western Lumber Co., tland, Oreg., has been appointed a member of Oregon State Board of Forestry. He succeeds orge L. McPherson, and represents the Oregon est Fire Association.

sher Odenwelder, jr., manager of the Easton ter Co., Easton, Pa., has been appointed a member the Pennsylvania Forest Commission. He suc- ds Henry W. Shoemaker, who resigned from the nmission upon being appointed minister to Bulgaria.

ynn F. Cronemiller has been selected to succeed the F. A. Elliott as State forester of Oregon. Theo- e Rainwater, of the Coos County Fire Patrol ociation, has been chosen to succeed Mr. Cronemiller leputy State forester.

. H. Marsh, who last year resigned from the ited States Forest Service as district inspector for rke-McNary work in the Southeastern States to ome vice president and general manager of the d Motor Co. at Staunton, Va., is now connected h the Virginia Commission on Conservation and velopment. His new duties have to do with the uisition of land for the proposed Shenandoah Park.

aul J. Fair has resigned his position in the San ncisco office of the United States Forest Service, ere he has been in charge of exhibit and motion- ture work for the past 10 years, and is now con- ted with the Montana Fish and Game Commission, which he will make a series of wild-life motion tures.

Howard J. Eberly is now district inspector in charge of Federal cooperation under the Clarke-McNary law in the Gulf States. Mr. Eberly, who received the B. S. degree in forestry from the Oregon State College in 1911, has had long experience in forest fire control activities as a member of the State forestry organizations of Texas and Oregon. Recently he has had charge of the administration of the Oregon forest taxation law. His headquarters are at New Orleans.

Samuel J. Record will represent the Yale School of Forestry at the International Botanical Congress to be held at Cambridge, England, August 16–23, and will open the proceedings of the First International Conference on the Systematic Anatomy of Woods, which is to be held in conjunction with the congress.

E. O. Siecke, director of the Texas Forest Service, has leave of absence for the months of June, July, and August, and is traveling in Europe. His plans included some travel in company with a group of forestry students from Oxford.

T. W. Norcross, chief engineer of the United States Forest Service, sailed June 4 for travel in Europe with the purpose of obtaining information that may facilitate the handling of water-power and other hydraulic work of the Forest Service. Mr. Norcross expected to confer with engineers and visit hydraulic developments in a number of countries, particularly Germany, Norway, and Sweden. Between June 27 and July 9 he was to attend the meetings of the International Electrotechnical Commission, in Stockholm, at which he was to participate in efforts toward international agreement on a method of giving stream-flow ratings to rivers.

F. G. Wilson has resigned as extension forester of Wisconsin to take charge of forest protection work under the Wisconsin Conservation Commission.

Charles R. Lockard is now assistant State forester of Vermont. Mr. Lockard is a graduate of the New York State College of Forestry and of the Harvard Forest School. He has had several years' experience as forester for the Diamond Match Co. in New England.

N. S. Rogers, for several years district warden for the fire patrol association of Columbia County, Oreg., has accepted a position with the State tax commission the duties of which are to assist county assessors in valuation of timber and of logging equipment and mill property. He is succeeded as district warden by E. A. McDonald.

Harold C. Bryant, of Berkeley, Calif., has been appointed head of the new branch of education and research in the National Park Service. He will have the title of assistant to the director and will be stationed at Washington, D. C. Doctor Bryant has served as economic ornithologist of the California Museum of Vertebrate Zoology and has for many years had charge of the educational and research work of the California Fish and Game Commission. He took part in the initiation of educational work in the national parks 10 years ago, when he helped to establish the nature guide service in Yosemite National Park.

Ralph W. Hussey, for eight years connected with the office of range management in the Albuquerque, N. Mex., office of the United States Forest Service, has been made supervisor of the Apache National Forest, Ariz., filling the vacancy left by the resignation of K. C. Kartchner.

Edwin C. Jahn has accepted appointment as associate professor of forestry, University of Idaho. Docto Jahn received the bachelor's and master's degrees from the New York State College of Forestry and the doctor's degree from McGill University, and at present i studying in Sweden under an industrial fellowship granted by the American-Scandinavian Foundation His major work has been in the field of cellulose chemistry and his minor in plant anatomy and wood technology. He will assume his new duties August 1

K. A. Salman, formerly with the Massachusetts Agricultural College, has been appointed agent at the Palo Alto, Calif., station of the United States Bureau of Entomology.

H. Y. Forsythe has resigned as district forester o the Tygart district, West Virginia, to become assistant supervisor of the Stokes State Forest of New Jersey, a Branchville, N. J.

Bibliography

The Plant in Relation to Water

By E. N. Munns, United States Forest Service

Plant physiology, particularly that part of plant physiology which treats of the use of water, is one of the foundation stones of silviculture; yet physiology receives little attention from the average practicing forester. In general, scholastic training in the subject has been inadequate, partly because of the lack of reliable texts and because references giving an account of the more recent advances in this field have not been readily available. It is, then, a pleasure to be able to recommend most earnestly N. A. Maximov's book, The Plant in Relation to Water, now available in an authorized English translation.[2]

In this work, which appeared in Russian in 1925, Maximov set himself the task of presenting in one volume a full account of the existing knowledge of drought resistance in plants, preceded by a discussion of the principal laws governing the absorption and transpiration of water. That this was a large order is evidenced by the mass of material on drought resistance that has been published in recent years. The author has made a very careful selection of his material, and writes well and lucidly.

In the translation, which was edited by R. H. Yapp, late Mason professor of botany in the University of Birmingham, England, Maximov has cut out two of his chapters on water transference, explaining that a detailed treatment of this important subject by him has been rendered unnecessary through the excellent treatment given it by H. H. Dixon. (Dixon's theory as to the cause of sap movement to the tops of tal trees is based on the cohesive force of water in smal tubes.)

Of more than passing interest is the fact that Maximov, in his work at Tiflis, Union of Socialist Sovie Republics, discovered experimentally, as did Brigg and Shantz in Colorado, that solar radiation is the principal factor in determining the rate of transpiration, with humidity of secondary importance and ai movement of much less influence. Maximov represents the land plant as a sort of wick along which a continuous stream of water escapes from the soil into the atmosphere. He points out that the total water content of a plant at any one time is small in comparison with the total quantity that may pass through it in a single day, the leaves of some plants being able even under shade conditions, to replace the whole o their water in the space of one hour. Either high sola radiation, dry air, or low moisture supply exerts a influence toward the production of leaves smaller and thicker and having more and larger veins than leave developed under the contrasting condition. Th author distinguishes between atmospheric drough causing temporary wilting and soil drought producin permanent wilting. The most disastrous conditio prevails when both occur, as is frequently the case o our Great Plains and on the steppes of Russia. I Maximov's opinion the basis of drought resistance i to be found in the capacity of the individual plant, o the variety, or the species to endure wilting. If thi is so, he remarks, the internal physicochemical properties of the protoplasm would appear to play th principal rôle in drought resistance.

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[2] George Allen & Unwin (Ltd.), London, 1929.

rgia Landowners Believe that Timber Growing is Profitable

By C. F. Evans, United States Forest Service

anyone about to engage in a new enterprise, ably nothing else is quite so encouraging as the ledge that efforts of others along the same line been successful. One good example of successful ice is worth more than a great deal of exhortation. table Forestry in Georgia, Bulletin 10 of the gia Forest Service, by C. A. Whittle, should there- prove a valuable aid in stimulating Georgia citizens eater activity in forestry. This illustrated bulletin pages is one of a series, each dealing with a single of forestry, and is similar in its general plan to ving Pine Timber for Profit in the South, Miscella- s Publication No. 21 of the Forest Service, United s Department of Agriculture, except that it deals cases in Georgia only.

e could hardly find in the entire United States her region from which so many examples of good t practice by private owners could be drawn as south Georgia and north Florida. Not all the 28 cited in the bulletin, however, are found in the pine and longleaf pine types. The Piedmont leaf and Appalachian hardwoods also are well sented. In his introduction the State forester ctly states that "only a few of the many reports could have been obtained are given herein." One minded of the prediction made by Austin Cary in Department of Agriculture publication previously red to, "Much of the country will be a timber en, a Mecca for foreigners interested in that way." e this prophecy is a long, long way from fulfilment, of the first steps have been taken and there is earth of such good examples of sound forest prac- as are described in the Georgia bulletin.

is to be hoped that a succeeding edition, promised he State forester in his introduction, will show definite figures on financial returns from forest agement. Such figures will no doubt be difficult btain; but a number of these same landowners roughly calculated their returns. More definite ments concerning plans of management would to the effectiveness of the publication. It is esting, and encouraging, to note the frequent ence to thinning and even pruning operations in and longleaf pine.

e statement (p. 6) that "even where no effort at t management is made there are 1½ to 2½ cords th per acre annually" seems unduly optimistic, for the rapidly growing southern pines. Probably ould be a rare case in which the growth would within this range without good management. page 7 the author estimates that because of lack anagement the average annual growth on 23,- 000 acres of forest and semiforest land in Georgia s than one-half cord per acre.

The bulletin is well illustrated and is written in a clear, readable style. It should prove a valuable addition to the list of Georgia Forest Service publications designed for general distribution.

Lumber, Lath, and Shingle Production in 1928

The twenty-fifth in the series of annual reports on lumber production in the United States published cooperatively since 1904 by the Bureau of the Census and the Forest Service is now available. The report covers the 1928 production of 13,268 mills, each of which sawed more than 50,000 feet of lumber, or the equivalent in lath or shingles, during that year. The total production of these mills was 34,142,123,000 board feet of lumber, 1,903,887,000 lath, and 5,603,690,000 shingles. The reports made by the mills for 1928 indicate a lumber production 1.1 per cent less than that indicated by returns received for 1927. The 1927 returns as compared with those of 1926 indicated a 6.5 per cent decrease. Statistics compiled by the Bureau of Statistics of the Interstate Commerce Commission show a corresponding decrease in shipments of forest products originated by Class I steam railroads (those with annual operating revenues above $1,000,000).

The most important lumber areas, from the standpoint of production, are the North Pacific States (Washington and Oregon) and the Southern States (Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, Oklahoma, and Texas). The former group took the lead in 1928 for the first time, producing 34.3 per cent of the national output of lumber. The Southern States had held the lead for a quarter century. The Southern States group plus the North Carolina pine States—North Carolina, South Carolina, and Virginia—produced 40.9 per cent of the country's total as compared with 10 per cent produced by the North Pacific States plus California and Nevada.

The production of more than 1,000,000,000 board feet of lumber in 1928 was reported by each of the States of Alabama, Arkansas, California, Georgia, Louisiana, Mississippi, North Carolina, Oregon, Texas, and Washington, the principal species cut being western yellow pine in California, Douglas fir in Washington and Oregon, southern yellow pine in each of the other seven States. Southern yellow pine, Douglas fir, western yellow pine, hemlock, oak, and white pine[3] contributed more than 1,000,000,000 board feet each to the total lumber cut in 1928. The cut of southern yellow pine was nearly one-third of the total cut in 1928, as in 1926 and 1927. Douglas fir, the nearest competitor of southern yellow pine, has contributed nearly one-fourth of the cut in each of the three years.

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[3] Including all "northern pine," which is often a mixture of northern white pine, Norway pine, and jack pine.

The bulletin, Forest Products: 1928—Lumber, Lath, and Shingles, may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents a copy.

Logging Waste in the Douglas Fir Region

Sound wood of cordwood size or larger that is left by the loggers as waste in the Douglas fir forests of the Northwest amounts each year to 3,088,748,000 board feet, according to the results of a study by Allen H. Hodgson, United States Forest Service. This waste constitutes about one-fifth of the volume of the Douglas fir stands cut each year and is the equivalent of almost one-tenth of the lumber produced annually in the United States. On the average acre, it was found, the loggers leave 21,407 board feet of sound material of cordwood size or larger, about half of which is small and large saw logs. Mr. Hodgson's survey, made in the years 1926–1929, covered 24 representative lumbering operations in western Oregon and Washington.

Reasons for this waste, in addition to economic forces and present logging methods, include topographical factors, injury to standing and down timber due to fungi and insects, fire damage, and the action of wind and sleet storms.

The report on this study was published serially during 1929 in two trade journals, the Pacific Pulp and Paper Industry and the West Coast Lumberman, and has since been published in the form of a 42-page bulletin illustrated with photographs and charts. A small number of copies of the bulletin, which is entitled "Logging Waste in the Douglas Fir Region," are available for free distribution by the regional forester, Portland, Oreg.

Major Soil Divisions of the United States

A handy little volume that will enable the forester to become better acquainted with the broad classification of soil types and the relation of these types to climate, geography, and forests is the Major Soil Divisions of the United States,[4] by Louis A. Wolfanger, economic and soil geographer, Columbia University. This volume of 139 pages presents in a form adapted to the understanding of the general reader the newer philosophy with regard to soil attributes, soil definition, and soil distribution. Whereas soil classification was formerly based on the theory that the characteristics of soil correspond closely with the properties of the geologic formations from which the bulk of their material is derived, the new concept gives first attention to the properties of the soils themselves, irrespective of their origin.

Climatic Influences on Growth and Se Production of Scotch Pine in t Netherlands

By E. N. Munns, United States Forest Service

Of particular interest to foresters is a paper by Hesselink, director of the Royal Forest Experim Station of the Netherlands, on certain ecological f tors in relation to the Scotch pine, a pine which Europe is a tree of real merit although in America has shown more limited forestry value. Doc Hesselink treats of the ecology of the tree on the ba of his work with it in the Netherlands. A dry summ was found to be unfavorable to both diameter a height growth of Scotch pine and a dry spring (May a June) appeared to have a stimulating effect on growth. The sea wind, resulting in high evaporati is mentioned as an influence favoring spring growth.

Of even greater interest to American foresters Doctor Hesselink's attempt to establish a relationship tween weather conditions and seed years. The weat during the late summer (August) when the flower bu are first formed is the critical period, he believes. shows that the Augusts of 1913, 1918, and 1921 w abnormally dry, and that 1915, 1920, and 1923 w good seed years. The low production of seed in 19 1919, and 1925 is ascribed to the wet and cold weat of August in 1912, 1917, and 1923. The favorable in ence of a good August, he points out, may be neutr ized by unfavorable weather during the flowering peri for example, the poor seed years of 1924 and 1927 explained by the wet, cold Mays of 1923 and 1926.

While the author's conclusions in this connection of interest, in my opinion the weather conditions the time of flowering have a more important beari on seed production of wind-pollinated trees than th at any other time. Frost, sleet, fog, rain, drought all may greatly influence the development of the flo into fruit. It seems desirable to point out that t lack of adequate phenological observations in Ameri is retarding greatly the development of our knowled as to what causes determine the incidence of the called "seed years." Such knowledge is greatly need as a guide in collecting seed and in storing seed for in periods when little seed is produced. The need it is felt with especial keenness in view of the prese interest in reforestation, and in connection with su circumstances as the failure of the Douglas fir se crop over the greater part of the tree's range for seve successive years and the apparently poor quality of t heavy crop of Norway pine seed collected a year or t ago. Only when American foresters begin systema cally to observe and record the behavior of trees sh we be able to learn what really influences seed prod tion and so be able to meet our forestation deman on a systematic basis.

(Mededeelingen van het Rijksboschbouwproefst tion. Deel III. Aflevering 3, 1928. pp. 357. Wi summaries in French.)

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[4] John Wiley & Sons (Inc.), New York, 1930.

Cork Oak for California

he growth of individual cork oaks at a number of ely scattered locations in California indicates that exotic may have value for watershed protection e, according to a report made to the Sacramento ion Citizens' Council in 1929 by its committee on oak. In its report, which was prepared by Woodge Metcalf, the committee did not undertake to lict very large financial returns from the growing of oak on California foothill lands. As a possible e second in interest to watershed protection it tioned the beauty which forests of cork oak, if quately protected from fire, might contribute to s now largely barren.

E. Morrow, in charge of the work at Chico, Calif., he Office of Foreign Plant Introduction, United es Bureau of Plant Industry, says:

> has been demonstrated over a period of years that cork oak is very well adapted to the Sacramento ey at least * * *. It will grow over a wide e of soils and even on thin red soils, but it makes best development on the rich river bottom lands. * It is better to plant the acorn where the tree grow, as it is an evergreen and does not transplant ily. It makes a very pretty avenue or street tree n properly trained. There is no doubt but what oak could be grown well up into the foothills to an ation of possibly 2,000 or more feet.

Ir. Morrow describes some trees planted on the E. Fields place at Biggs, Calif., set out about 40 s ago by John Rock, president of the California sery Co., which have attained heights of approxiely 30 or 35 feet and diameters of 4 feet.

n the McGill ranch near Oakville, Napa County, it 50 cork oaks now approximately 45 years old have ived from a planting said to have been made with ns brought from Europe by a former owner of the erty. When trees in this plantation were measured anuary, 1929, one was found to be 25.4 inches in neter at breast height and 37 feet in height. This was situated on bottom land along an irrigation h. The other trees so situated of which measurets were taken averaged about 17 inches in diameter 20 to 24 feet in height. Of the trees growing on a y hillside with very shallow soil some were very bby, with diameters of from 5 to 8 inches and hts of from 12 to 14 feet. A good number of small s were starting up near the old ones along the ation ditch, but there was no evidence of natural oduction on the hillside.

ork oak has been used extensively for street and way planting in southern California, particularly os Angeles County.

successful plantation of cork oak was developed at Chico Forestry Station, Butte County, now a of Bidwell Park of the city of Chico, by planting ns 6 by 6 feet apart on thin, gravelly red soil and ivating during the first few years to keep down the weeds. Measurement of the trees in this plantation at the age of 21 years gave the following figures:

Trees per acre	number	383
Average diameter at breast height	inches	5. 5
Average height	feet	24
Diameter of largest tree	inches	14. 6
Height of largest tree	feet	39

All the trees in this plantation, it is reported, have a good coating of fluted, corky bark. The plantation bears some acorns almost every year and usually bears a good crop.

D. Fricot, who started a plantation of more than 200 cork oaks near Angels Camp, Calaveras County, in the spring of 1928, reported that trees 12 to 14 inches high developed in one year from acorns sown in the field.

Cork oak trees in California are apparently practically free from diseases, the report indicates. A powdery mildew has appeared on a few trees, but this can be controlled by dusting with dry sulphur. Slight attacks by oak twig borers and another minute insect have been noted in Los Angeles County. The oak moth, which causes serious defoliation of the native coast live oak, has occasionally been found attacking the leaves of cork oak. This can easily be controlled by using a lead arsenate spray while the caterpillars are small. When acorns of cork oak are sown in the field they must be protected from ground squirrels and other rodents. Gophers seem to be particularly fond of cork oak roots.

No systematic stripping of entire trees or groups of trees could be reported on, hence evidence was lacking as to the suitability of bark from California cork oaks for commercial purposes.

The report by Mr. Metcalf, including a discussion of the growing and utilization of cork oak in foreign countries, was published in the October, 1929, number of the Monthly Bulletin, California Department of Agriculture.

Smithsonian Bulletin Predicts New Method of Forecasting Weather

In a 49-page bulletin entitled "The Atmosphere and the Sun," just issued by the Smithsonian Institution, Washington, D. C., H. Helm Clayton gives a condensed account of the results of 20 years' research on the relation of the sun's activity to atmospheric changes, and discusses the possibility of forecasting weather on the basis of study of variations in solar activity. C. G. Abbot and his associates in the Smithsonian Astrophysical Observatory have found evidence of complicated pulses of the sun's radiation occurring both as changes over periods of years and as shorter variations of only a few days' duration. These pulses, Mr. Clayton states, are attended by variations in atmospheric pressure, which affect the circulation of the atmosphere.

New Senate Document on Flood Waters of the Mississippi

An 80-page report entitled "Flood Waters of the Mississippi River" prepared for the National Flood Commission by the Research Service (Inc.), Washington, D. C., has been published as Senate Document No. 127, Seventy-first Congress. In the preface Walter Parker says:

> With a definite goal in mind, competent engineers can and will plan in such a way as to work with, instead of working against, nature.
>
> To this end the full cooperation and active services will be required of the experts of the Agricultural Department on forestry, soil porosity, soil erosion, soil moisture; of the Interior Department on irrigation, drainage, and the conservation of natural resources; of the Power Commission on power; of the War Department on channel improvement and navigation; of the Department of Commerce on transportation, trade, and communications; of the States, localities, and business enterprise on cooperation and the sharing of costs.

National Parks of the World

An article in the January, 1930, Revue des Eaux et Forêts entitled "A l'Académie des Sciences—Les Parcs Nationaux," by Louis Mangin, president of the academy, contains a brief discussion of national parks throughout the world. Countries mentioned as having parks or similar reserves are the United States, Canada, New Zealand, Australia, South Africa, the Belgian Congo, the British and Dutch East Indies, Burma, Japan, England, Switzerland, Italy, Sweden, Poland, Czechoslovakia, Germany, Austria, and Madagascar. Professor Mangin urges the carrying through of the project discussed at the Pan Pacific Congress at Java last year of an international organization for the protection of natural beauties and of flora and fauna. He also urges immediate steps to save important areas under French administration, such as the islands of Crozet, Saint Paul, and Amsterdam, by converting them into national parks.

A New Ecological Journal

Arrangements have been completed between the Ecological Society of America and Duke University for the establishment of a new quarterly journal to be known as Ecological Monographs, which will begin publication in January, 1931. The Ecological Society becomes responsible for appointing all but one of the editorial board and for the editorial policy of the new series. Duke University will be represented by one member of the editorial board and will assume charge of publication and of financial matters. The society has elected as editor A. S. Pearse, Duke University. Barrington Moore, editor of Ecology, is ex officio associate editor of Ecological Monographs. Elected associate ed are H. A. Gleason, Brooklyn Botanical Garden; J Weaver, University of Nebraska; E. N. Trans Ohio State University; R. N. Chapman, Universit Minnesota; R. E. Coker, University of North Carol and Chancey Juday, University of Wisconsin. proposed to publish in the new journal papers fro to 100 printed pages in length, which are too long Ecology, the society's older journal. The boar editors will consider scientific manuscripts dealing any aspect of ecological investigation, including practical fields as horticulture, economic entomol and forestry, but will not consider technical pa dealing solely with economic problems.

Sustaining members of the Ecological Society receive Ecological Monographs without increas dues, just as all regular members now receive Ecol The subscription price will be $6 per annual volum about 500 pages.

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National Forest Administrative Maps: ¼-inch, Clev land, Umpqua; ½-inch, Pend Oreille (4-color), A saroka, Crater, Rainier, and Umatilla. Map western Colorado covering several national fores

National Forest Proclamation Diagrams: Arapah Cochetopa, Gunnison, Pike, and Routt.

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FOREST WORKER

September, 1930

Issued bimonthly by the FOREST SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

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Announcements

Society of American Foresters to Meet in Washington, D. C.

The Society of American Foresters will hold its annual meeting of 1930 at the Wardman Park Hotel, Washington, D. C., December 29–31. It is planned to have William B. Greeley and Secretary of the Interior Wilbur lead a discussion of the public-land policy of the United States. Other speakers will describe progress in private forestry enterprises. A full day will be devoted to technical papers. It is planned to have reports on findings from erosion and flood-control studies in California and in the Mississippi Valley. The society's thirtieth anniversary will be celebrated with a birthday banquet.

Special railroad rates have been granted under the certificate plan for those attending this meeting. Inquiries in regard to arrangements for the meeti should be addressed to the society's executive secreta W. R. Hine, 1523 L Street, NW., Washington, D. C.

Information Desired as to Suspecte Cases of Dutch Elm Disease

Plant pathologists endeavoring to determine t present distribution in this country of the Dutch e disease have requested that information about a deaths of elms suspected to have been caused by t disease and short sections of limbs of any elms showi symptoms of it be sent to the Department of Bota and Plant Pathology, Agricultural Experiment S tion, Wooster, Ohio. Symptoms of the disease described by Dr. Haven Metcalf on page 12 of t number of the Forest Worker.

The Forest Worker is published by the Forest Service, United States Department of Agriculture, Washington, D. C. Jean Kerr, editor. Material offered for publication in the Forest Worker should be addressed to the editor.

Because the free edition is necessarily limited, this periodical can be distributed without charg outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestr associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for single copy or 25 cents for a year's subscription to the Superintendent of Documents, Governmen Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

FOREST WORKER

ashington, D. C. SEPTEMBER, 1930 Vol. 6, No. 5

State Forestry

entucky Makes Fire Patrol of Timberlands Compulsory

A law of Kentucky approved this year requires that
iberland be patrolled during the forest fire season.
the owner does not provide patrol, through member-
p in a fire-protective association or otherwise, the
ite may provide it at the owner's expense. The
ount that may be charged by the State against a
iberland owner for patrolling his land is limited to
ent per acre per year. Timberland is defined as any
d on which timber or woody brush is present in
ficient quantity to constitute a fire menace to the
d itself or to adjoining land. If a property is not
re than 100 acres in extent, residence of the owner or
see on the property is held to constitute adequate
tection.

This act also empowers the governor, upon recom-
ndation of the State forest service, to accept gifts of
d for State forest reserve purposes, and extends the
te forester's term of office from two to four years.
makes the setting of woods fires resulting in damage
the property of another punishable by a fine of
m $10 to $100, imprisonment for from 10 days to
nonths, or both fine and imprisonment, and estab-
ies the same penalties for setting fire to grass, straw,
anything else capable of spreading fire on land.

alifornia Division of Forestry Creates Branch Organization

The California Division of Forestry now has a
nch organization in the southern part of the State,
h headquarters at Pasadena. Walter H. Coupe,
three years State forest inspector in southern Cali-
nia, has been made deputy State forester in charge
the new branch. He will be assisted by Jess A.
aves, formerly of the Los Angeles County forester's
ce. Mr. Graves will act as fire chief for San Ber-
rdino, Riverside, Orange, and San Diego Counties,
d as liaison officer between the State forestry divi-
n and the county forestry organizations of Los An-
es, Ventura, and Santa Barbara Counties.

A new fire-protection district has been organized,
isisting of San Bernardino, Riverside, and Orange Counties. These three counties form a natural fire-protection district, State Forester Pratt explains, all obtaining their water supply from the San Bernardino Mountains. State Forest Ranger E. W. Nelander will be in charge of the new district, with headquarters at San Bernardino. Charles Van Fleet, formerly assistant ranger at San Jacinto, will succeed Ranger Nelander as State forest ranger for Riverside County.

Colorado Highway Forces to Cooperate in Protecting National Forests

The Colorado Highway Department recently entered into an agreement with the United States Forest Service providing that when employees of the department discover fire on national forest land adjacent to rights of way where they are working they will report the fire to forest officers and will take immediate action to suppress it. The expense of such suppression work will be borne by the department if its employees are responsible for causing the fire, otherwise by the Forest Service. When the department enters into contracts for the construction of public works through national forest areas it will require contractors and their employees to take all practicable measures to prevent and suppress fires adjacent to rights of way and camps.

Michigan Prepares for Forest Fire Studies

The Michigan Department of Conservation has prepared a forest area of about 1,700 acres in Roscommon County for use as a forest fire experiment station. With the cooperation of the United States Forest Service, the department plans to study fire weather, fire damage, control methods, improvement of equipment, and cost and maintenance of fire lines. Plots of 1 or 2 acres each, surrounded with fire lines, are to be subjected to controlled burning. G. I. Stewart has been made supervisor of the station.

◆

Virginia's appropriation for its State forest service, which has been about $33,000 for each of the past few years, was increased this year to $50,000.

Forest Fires of 1929

A summing up of forest fire reports made by State forestry officials and national forest officers indicates that fires of the calendar year 1929 covered 46,230,120 acres of land in the United States.[1] The total area needing protection from forest fires in that year was officially estimated at 589,809,240 acres; the total area for which such protection was provided was 398,918,960 acres. The year's fires covered 4,876,320 acres of the protected area and 41,353,800 acres of the unprotected area. Thus the fire toll was about 1 acre in 5 of unprotected land and a little more than 1 acre in 100 of protected land.

Fire damage was officially estimated at $87,916,850 on unprotected land and $14,135,550 on protected land.

The fires reported total 134,895. Of this number 44,076 occurred on protected and 90,819 on unprotected areas.

Smokers again figured in the reports as the leading cause of forest fires on protected lands in the United States, being held responsible for 21.6 per cent of the fires. Incendiaries took second place with 17 per cent. The burning of débris was reported to have caused 12.4 per cent, lightning 9.8 per cent, campers 8.7 per cent, railroads 8.3 per cent, and lumbering 3.9 per cent. In 1929 as in 1928, fires of unknown origin made up 7.9 per cent of the total on protected areas.

In percentage of protected area burned four groups of States bettered their averages for the preceding three years. These were the Northeastern States (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, and New York), the Middle Atlantic States (New Jersey, Pennsylvania, Delaware, and Maryland), the Southeastern States (Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida), and the Central States (Ohio, Indiana, Illinois, Kentucky, Tennessee, and Missouri). The proportion of protected area burned over was 0.12 per cent in the Northeastern States, 0.45 per cent in the Middle Atlantic States, 0.85 per cent in the Southeastern States, and 0.94 per cent in the Central States. These four groups also lowered their 3-year records as to average area burned over per fire on protected land, with the following averages for 1929: Northeastern States, 16.3 acres; Middle Atlantic States, 22.6 acres; Southeastern States, 66.3 acres; and Central States, 63 acres. For other groups the proportion of protected area burned over was as follows: Gulf States (Alabama, Louisiana, Mississippi, Texas, Arkansas, and Oklahoma), 4.02 per cent; Lake States (Michigan, Wisconsin, and Minnesota), 1.01 per cent; Rocky Mountain States (Montana, Idaho, Wyoming, South Dakota, Colorado, Arizona, New Mexico, Nevada, and Utah), 0.48 per cent; and Pacific States (Washington, Oregon, and California), 2.24 per cent. For all groups the percent of protected area burned was 1.22 and the average a burned over per fire on protected land was 110.6 ac

Fire Truck Given to Hillsboro, N.

The New Hampshire town of Hillsboro has acqui a specially constructed forest-fire truck as a gift fr Caroline A. Fox, of Arlington, Mass. Ralph L. M gan, of Richmond, N. H., designed the truck and h it assembled. It has rear steps, a cab, a capstan r hub enabling it to pull itself out of mudholes by own power, a water tank of 400 gallons capacity, an pump, attached to the front end, which can be opera while the truck is in motion. The tank can be refil through suction connection in about five minut In addition to its stationary equipment the tr carries a 4-cylinder portable forest-fire pump w 1,000 feet of hose, several 5-gallon hand water pum and a supply of other small fire-fighting tools.

Connecticut Forest Work Camp

An experimental "forest work camp" in which experienced woods workers were offered three wee maintenance and a wage of $1 for each of 15 work days was opened August 4 on the People's St Forest, Litchfield County, Conn. The age minim for admission was 18 years; other requirements w good health and ability to do manual work. E man was required to work seven hours daily five d a week. State Forester Hawes, who had charge of camp, planned to use the temporary labor thus obtai in cutting fire lines, cleaning out woods roads, weed forest plantations, and carrying out blister-rust cont and forest nursery activities. The cost of the camp divided equally between the Connecticut Fores Department and the Connecticut Forest and P Association. Applications received exceeded the pacity of the camp.

◆

A "conservation map" of New York has been pared by the State conservation department for tribution to tourists. This is an up-to-date highv map on which are marked and listed all parks, pul camp grounds, and other lands under the departme jurisdiction, fire observation towers, and points historic interest.

◆

Marine Corps flying forces at Quantico, Va., h cooperated with the Virginia Forest Service this son by making two flights daily over Prince Willi County and adjoining counties for the purpose detecting forest fires. Fires were reported by fliers to forest wardens, whose locations were indica by whitewashed V markers made of 16-foot boards

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[1] Figures given in this article are for private and State-owned forest land and national forests in continental United States exclusive of Alaska. Those for unprotected areas are necessarily rough approximations.

Visconsin Commission Proposes State Forest Purchase Program

The Wisconsin Conservation Commission recently
de a state-wide survey with the purpose of locating
as that are suitable for State forests and that could
ily be acquired by the State without excessive expend-
re. As a result the commission has proposed the
ablishment of six State forest purchase areas com-
sing more than 1,000,000 acres of forest land. In
r of these areas a considerable proportion of the land
lready in State ownership; and the State land com-
ssion, which has jurisdiction over such portions of the
te-owned land as are not under the control of the
servation commission, is willing to have them put to
estry use. The six proposed purchase units, their
al areas, and the areas of State-owned land they
lude, are as follows:

. The Brule River forest, in eastern Douglas County;
000 acres, 5,600 acres State owned.

. The Flambeau River district, in Sawyer County;
roximately 100,000 acres, 4,800 acres State owned.

. The district north of Rhinelander, in Vilas and
eida Counties, including Northern Forest State
k and the American Legion Memorial State Park and
est Preserve; 265,000 acres, about 140,000 acres
te owned.

. The Thunder Mountain district, in Marinette
l Oconto Counties; 190,000 acres, 4,000 acres State
ned.

. The central counties district, embracing parts of
kson, Clark, Monroe, Wood, and Juneau Counties;
,000 acres, comparatively little State owned.

. The Kettle Moraine district, in Fond du Lac and
boygan Counties; 50,000 acres.

Vith the exception of the sixth, much of which is
v in farms, all these areas are now protected from
under the supervision of the conservation commis-
n.

t is expected that about $80,000 of the money raised
year by the one-twentieth mill forestry tax levied
the last legislature will be available for land purchase
he purchase project is approved by the governor.

klahoma State Forest Nursery Enlarged

n order to meet a steadily increasing demand for
est trees to be planted on farms the Oklahoma
rest Service has enlarged its nursery by 4 acres.
e extension, like the 4-acre area originally developed
the service as a nursery, is part of the grounds of
Oklahoma Agricultural College. Overhead irriga-
n has been provided for a portion of the added area.
a result of the enlargement the number of little
s available for distribution in the fall of 1930 and
spring of 1931 is 275,000.

Chinese elm continues to be most in demand. Other species popular with Oklahoma farmers are black walnut, green ash, American elm, silver maple, jack pine, Scotch pine, and western yellow pine.

In spite of unfavorable weather in the summer of 1929, survival has been satisfactory in plantations established with Oklahoma State nursery trees in the spring of that year.

Rhode Island Towns Must Appoint Tree Wardens

Under a 1930 amendment to the tree warden law of Rhode Island the appointment of tree wardens by towns and cities, previously optional, becomes mandatory. Appointments are subject to the approval of the chief of the State bureau of forestry. The State law authorizes and requires the wardens to supervise the care and protection of public shade trees.

An association of Rhode Island tree wardens has been formed this year, and already includes representatives of 15 towns and cities.

Forestry Lectures in the Kentucky Mountains

The Kentucky Forest Service employs F. W. Nichols, a graduate of the Pennsylvania State Forest School, as a forestry lecturer. Mr. Nichols began last fall to visit mountain districts of the State, lecturing at all the public schools in each county visited. The work was resumed in the spring and again when the schools reopened in the summer. Mr. Nichols travels on horseback, with his stereopticon, slides, and other equipment loaded on a second horse. Up to August 1 he had lectured at 216 mountain schools before audiences totaling 14,020 persons.

◆

New Jersey State forests were enlarged by 6,922 acres in the year ending June 30, 1930. The Bass River and Belleplain State Forests were more than doubled in area by additions of 4,585 and 1,706 acres, respectively. The average cost per acre of the land purchased was $7.05. The seven New Jersey State forests now have a total area of 33,637 acres.

◆

Fifteen Vermont municipalities reported forest planting in the spring of 1930. The village of Lyndonville began reforesting a 100-acre area under the management of its electric-light department. The municipalities planted a total of 223,300 trees. In the fall of 1929 and the spring of 1930, 14 counties of Vermont planted about 1,833,338 trees.

Delaware Erects Nursery House at Small Expense

The Delaware Forestry Department is erecting at its forest nursery near Milford, Del., a 2-story frame nursery building 35 feet by 20 feet 8 inches for which the contract price, without extras, was $1,840. The building is being constructed mainly of Douglas fir, and has wood shingles on sides and roof. It is set on a concrete foundation and will have a 5-inch concrete lower floor. W. S. Taber, Delaware State forester, at Dover, offers to send a copy of the plans for the nursery house to any forestry department desiring one.

◆

The Michigan Conservation Commission has voted to purchase 12,000 acres of land in northwestern Schoolcraft County, in the Upper Peninsula, for a game refuge and public hunting grounds. The property includ the Cusino Swamp. A 1-mile belt of hunting groun will surround the game refuge. The State is payi $130,000 for the property and is setting aside $10,0 for its organization and current administration.

◆

A 200-acre forest has been given to the town Dunbarton, N. H., by the children of Francis a Harriet P. Winslow, in memory of their ancestc Gen. John Stark and Maj. Caleb Stark.

◆

In an effort to stop the encroachment of sand dun on the grounds of the Empire radio station, near Empire, Oreg., 10,000 maritime pine transplants provid by the Oregon Forest Nursery have been planted the coast side of the grounds.

Education and Extension

Information on Local Timber Market Made Available to New York Farmers

Extension Forester J. A. Cope, of New York, has in his office a card index that enables him to give any farmer in Broome, Chemung, or Tioga County definite information as to local markets for various kinds of lumber and as to the kinds and grades of material desired by individual local wood-using industries. His information is based on a survey made in 1928–29 by Charles A. Gillett, then assistant extension forester for New York, at the expense of the New York State committee on wood utilization and Cornell University's department of forestry. In the course of this survey Mr. Gillett visited 66 wood-using industries operating in the three counties. He also called on sawmill owners to determine their views on utilization problems and obtain data on manufacturing and marketing costs, visited woods operations to get information on logging methods and stumpage costs, and obtained from local railway agents information as to quantities of forest products shipped out of the counties.

The 66 wood-using industries reported that they had used 90,204,000 board feet of lumber in 1927, of which 10,330,000 board feet came from woodlands within the three counties. In addition 10,709,235 cubic feet of local timber had been used locally for cordwood, ties, posts, and mine timbers. During the year 305 carloads of lumber averaging 18,000 board feet each had been shipped out of the three-county area for use elsewhere. The managers of the wood-using industries signified that they were willing to use 20,361,000 board feet of local wood in 1929, a quantity very much greater than Mr. Gillett's estimate of the annual yield of the farm woodlands existing in the three counties.

Tables were compiled showing for each commerc timber species growing in the locality what local dustries used it and what quantities were used local Tables were prepared also to enable the farmer determine the value of his own stumpage. A 50-ac tract conveniently located was chosen for a timb marketing demonstration, the expense of which w borne by the owner. After marking the trees to cut Mr. Gillett prepared a letter indicating the lo tion of the tract and the number of trees, by diame classes, offered for sale, and sent it to wood-using dustries that had expressed willingness to buy t species represented. He prepared a valuation sh for the use of the owner, showing the estimated boa foot contents of the trees to be cut and the stump value of each species, and also a timber-sale contra Other possibilities for educational use of the d obtained in the study include sawmill schools which operators of portable sawmills may learn avoid mistakes which, according to data obtair from the wood-using industries, reduce the de ability of local sawmill products.

◆

The agriculture class of the Little Valley Hi School, Cattaraugus County, N. Y., planted 7,0 spruce and 5,000 pines and larches this year on 5-acre plot that had been given to the school. T years from now, they expect, the school can harves crop of Christmas trees by removing three-fourths the spruce, in from 15 to 25 years the larches can cut for fence posts and telephone poles, and ab 1980 the final cutting will have a noticeable effect taxes of the school district.

School Forests for Michigan

By R. F. Kroodsma, Extension Forester for Michigan

This year has seen a new phase of planting introduced o the State of Michigan—the school forest. This a came to Michigan via Australia and Wisconsin. rthern Michigan presents a different problem in estry from the portions of the State that were tled earlier; there is still a land-clearing problem, foreign element is large, and much land is held large corporations such as mining and lumber npanies. This means a special need for forestry icational work. In order to interest the public ools in forestry, the forestry department of the chigan State College offered to give enough trees the planting of 5 acres to each school that would rt such a project. The school-forest idea appealed school superintendents because they realized its icational possibilities. There was a wide interest ong large landowners, also, and in every case in ich a forest was started a tract of from 40 to 160 es was donated by some organization such as the rd Motor Co., the Cleveland Cliffs Iron Co., or the arcoal Iron Co. These donations of land simplified tters a great deal, since Michigan law does not vide for the purchase of land by school boards. e United States Forest Service assisted with the nting.

Twelve township schools took advantage of the offer free trees and land to start their forests. The ools, and the areas acquired as school forests, as follows:

Township	County	Area (acres)
nwood	Gogebic	160
raga	Baraga	40
Anse	do	40
nton	Houghton	160
vood	Schoolcraft	40
idstone	Delta	40
rth Lake	Marquette	40
gaunee	do	40
public	do	40
sh	Dickinson	40
ntland	Luce	40
wberry	do	40

Most of the plantings were put in by the furrow thod and consisted in a mixture of northern white e and white spruce, both of which are native to section. Each forest was provided with a 4 by 6 t sign, which was placed in a prominent position r the highway. Plantings were made during the t two weeks in May and dedication exercises were d in the last two weeks of the month. These exises included the presentation of the deed to the d, formal presentation of the trees, and talks on est conservation and the purpose of school forests representatives of the State and Federal forestry organizations, the extension service, and the State university. The dedication was by Dean J. F. Cox, of the Michigan State College of Agriculture, and George Bishop, of the Upper Peninsula Development Bureau. C. A. Rood, assistant State club leader, charged the pupils with the duty of caring for the forest.

These 12 school forests are intended to serve as outdoor laboratories for nature study in all its phases. Scattered as they are over the entire Upper Peninsula, they can not help but create a forest consciousness among the boys and girls directly interested and among their fathers and mothers and other adults as well. In time the plantings should also afford a revenue to the schools, the spruce as Christmas trees and pulpwood and the pine as sawlogs.

It is expected that additional school forests will be established this fall in Ontonagon and Menominee Counties.

Duke University Announces Forestry Program

Duke University, Durham, N. C., plans to initiate forestry work in the fall of 1930. Clarence F. Korstian, senior silviculturist of the Appalachian Forest Experiment Station, will go to Durham in September to take charge of the Duke Forest, an area of about 5,100 acres adjoining the university campus. The area is forested with second-growth shortleaf pine, loblolly pine, and hardwoods, and is said to be representative of forests of the lower Piedmont region. When a survey and inventory of the forest have been made a preliminary management plan will be drawn up, providing for demonstration and research work. Later, after a study to determine what forestry educational needs the university may best undertake to fill, it is planned to establish a school of forestry.

Doctor Korstian holds the M. F. degree from the University of Nebraska and the Ph. D. degree from Yale University. He joined the United States Forest Service in 1912 and had experience in forest research work in the southwestern and intermountain regions before he was assigned to the Appalachian station in 1921. His title at Duke University will be director of the Duke Forest and professor of silviculture.

◆

New Hampshire 4-H club members planted 361,000 trees on cut-over lands and abandoned fields in the State during the spring months of 1930, writes Extension Forester Barraclough. Vocational agricultural schools planted 36,750. Children of Cheshire County alone planted 115,000 trees, 55,000 of which were given to them by the Keene Forestry Associates and Ralph L. Morgan. Walpole High School completed a 15-acre plantation, planting 5 acres for the third successive year.

Selection Cutting on New Hampshire Woodlot

H. H. Rice and James Perry, owners of woodland in the town of Rindge, N. H., are experimenting with selection cutting, reports Extension Forester K. E. Barraclough. Both partners have an interest in a sawmill. After buying a wood lot in the town of Rindge a year or so ago they abandoned their original plan of clear cutting the timber, on the theory that if only the larger logs were brought into the mill the increase in the cost of logging would be offset by the saving in cost of manufacture. Accordingly hardwoods less than 9 inches in diameter and spruce, hemlock, and pine less than 12 inches in diameter were left to grow. Most of the hardwood, spruce, and pine was cut, and an excellent stand of hemlock 20 to 40 feet high was left on the lot. At the mill where the logs were sawn hemlock is practically as valuable as the other softwoods, being used locally in the manufacture of such articles as candy boxes and fig boxes. The owners estimate that selection cutting increased their cost of logging by about 75 cents per 1,000 board feet but that it reduced the cost of manufacture by about $1 per 1,000 with very little reduction in the quantity of good material obtained. Receipts from the 570 cords of lumber and 320 cords of wood obtained have more than paid for the lot, and the leaving of 200 cords of growing timber has brought the next harvest from the lot at least 25 years nearer, Mr. Barraclough says.

Girl Scouts of Capital Establish Permanent Camp on Shenandoah Forest

Girl Scouts of the District of Columbia camped this summer, and expect to camp again many times, on a site on the Shenandoah National Forest, in Virginia. A committee including Mrs. Herbert Hoover visited the forest last winter in search of a suitable permanent camp site for the girls, and found what they wanted at the North River Gap, 26 miles southwest of Harrisonburg, Va. At this point the Forest Service maintained a public camp ground. The service consented to give the Girl Scout organization a 25-year lease on the area of 5 acres which they needed for permanent camp buildings and a yearly lease on a surrounding area of 41 acres. A substitute camp ground for the general public is being developed on Hone Quarry.

A gift of $10,000 from Mrs. Henry H. Flather, for whom the camp has been named, and other contributions from several sources, have made possible the construction of four units of camp buildings housing in all 96 girls. Cabins have been constructed of logs and slabs, and each unit has been completed with a troop house, a wash house, and an outdoor kitchen. A main lodge or recreation hall is now under construction. The North River, on both sides of which the can
buildings are situated, has been bridged in two plac
Unnecessary clearing away of underbrush has be
avoided and the camp is so well hidden by trees as
be invisible at a distance of 50 yards.

Two miles up the river in a grove of northern wh
pine are "pioneer" camps where girls who ha
mastered certain points in woodcraft live in primiti
fashion. Ten Adirondack lean-to's built of sla
shelter two girls each. Provisions are procured at
storeroom by a system of barter. Unusual plar
found by the girls figure in the trading.

With the summer season divided into four periods
two weeks each it is expected that about 500 girls w
be able to use the camp each summer. Some win
camping is planned.

Southern Forestry Educational Proje Loses One Cooperator and Gains One

The State of Georgia has withdrawn from partici
tion in the southern forestry educational project
which several States are cooperating with the Americ
Forestry Association, and South Carolina has taken
place. The South Carolina State Forestry Board
agreed to spend $6,500 on the project during the pres
fiscal year, having obtained that amount partly throu
contributions by large timberland owners. T
lecturers, and two trucks equipped with motion-pict
projectors, films, and exhibits, have been transfer
from Georgia to South Carolina, and a third lectu
is in action in South Carolina using a similar tr
owned by the State. It is hoped that by June 30, 19
forestry lectures will have been made and fores
motion pictures shown in practically every So
Carolina public school.

W. C. McCormick, regional director of the south
educational project, has moved his office from Thom
ville, Ga., to Lake City, Fla.

* * *

A 1-semester course in forestry will hereafter
required of students of agriculture in the University
Arkansas as a part of the work of the sophomore y

* * *

A wood-utilization exhibit was shown by the Natio
Committee on Wood Utilization at the American I
held in the Atlantic City Auditorium July 14–Aug
27. Six hundred square feet of space was allotted
the committee. Posters, charts, and models il
trated the committee's principal projects, show
among other things approved methods of reside
construction, the use of treated lumber to av
decay and insect injury, utilization of second-h
containers and odd pieces of lumber, and the adv
tages of grade-marking lumber.

Forest Service Notes

A Pulpwood Industry in the Rockies

By E. E. Carter, United States Forest Service

'he regional forester at Denver has awarded two
es of national forest pulpwood, aggregating more
n 2,000,000 cords, to the Trans-Mississippi Develop-
nt Co., a new subsidiary of the International Paper
Back of this announcement are years of work and
e on the part of foresters of the Rocky Mountain
ion. There are at least 15,000,000,000 board feet
Engelmann spruce and alpine fir on the national
ests of Colorado alone, and heretofore there has been
le market for these species. The railroads did not
it them for ties; house builders wanted pine lumber,
spruce, and still less the nondurable alpine fir.
ey have been the local "despised species" which Doc-
Schenck advised all foresters to watch. They were
wn to be excellent woods for reduction to pulp form
the mechanical or sulphite processes, but there were
pulp mills in Colorado or within such distance that
haul was thought practicable. The foresters were
fident that sometime a pulpwood market would
elop; but meanwhile their silvicultural practices in
mixtures of pines, spruces, and true firs were ham-
ed and the older spruce stands were left in storage,
h the ground unproductive because growth was
anced by decay, windfall, and other causes of loss.
'inally a Wisconsin paper-making firm became in-
ested in the possibility of getting its wood in Colo-
o. The areas offering the best chances for large-
le production were cruised. The timber on two
ts on opposite sides of the Continental Divide, one
the Rio Grande Forest and one on the San Juan,
found to be sufficient to supply a good-sized pulp
l for at least 20 years. It was appraised at $1 per
d on the more accessible unit, that on the Rio
ande Forest, and at $0.75 per cord on the San Juan
t. Widespread advertisement was started. The
ılts surprised the foresters. Three bids for both
ts came from reputable paper-manufacturing com-
ies. The high bidders offered $3.03 per cord for
Rio Grande pulpwood and $1.77 per cord for that
the San Juan. Good spruce pulpwood is in demand,
l apparently all that was needed was evidence that
vas available in sufficient quantities to constitute a
endable supply behind the heavy investment neces-
y for paper making.
'olorado will have a pulpwood industry. It is
tain that, once such an industry is established, the
rators will want to buy odd lots of spruce and true
that can be brought to a railroad shipping point by
er lumbermen who are getting out lodgepole pine
ties as their chief product. It may confidently be expected that these sales will result in a market for pulpwood throughout the region, thus leading to better silviculture and closer utilization on the forests and to the growth of more prosperous communities of forest workers.

National System of Experimental Forests and Ranges Inaugurated

By L. F. Kneipp, United States Forest Service

On August 7, 1930, the Acting Secretary of Agriculture approved a national-forest regulation which marks a new epoch in the forest-research work of the United States. The regulation is as follows:

> The Forester shall determine, define, and permanently record a series of areas of national-forest land to be known as experimental forests, sufficient in number and extent adequately to provide for the experimental work necessary as a basis for forest production or forest and range production in each forest region, these areas to be dedicated to and used for research; also where necessary a supplemental series of areas for range investigations to be known as experimental ranges; and a series to be known as natural areas sufficient in number and extent adequately to illustrate or typify virgin conditions of forest or range growth in each forest or range region, to be retained in a virgin or unmodified condition for purposes of science, research, and education; and a series of areas to be known as primitive areas within which will be maintained primitive conditions of environment, transportation, habitation, and subsistence, with a view to conserving the value of such areas for purposes of public education and recreation. Within any areas so designated, except for permanent improvements needed in experimental forests and ranges, no occupancy under special use permit shall be allowed, or the construction of permanent improvements by any public agency be permitted, except as authorized by the Forester or the Secretary.

The purpose of the experimental forests is to make permanently available, for silvicultural, range, products, and other related forest research, areas as fully representative as possible of conditions in important parts of forest regions and large enough to meet present and foreseeable needs. In essence these areas are to be field laboratories for intensive investigative work. A secondary but hardly less important purpose is to provide for the demonstration of results, favorable or otherwise, of widely varying silvicultural and other forest practices. Each experimental forest is to be chosen on the basis that it adequately represents the subregion in which it is located as to forest types and sites and the conditions which underlie types and sites (such as soils, climatic variations, and altitudinal range). Wherever possible each experimental forest is to include a "natural area" on which are to be preserved in an unmodified condition examples of the virgin growth of each forest or other vegetative type within each forest region, to the end that the region's characteristic plant and animal life and soil conditions shall continue to be available for scientific and educational purposes.

So far as can now be foreseen, from 5 to 10 experimental forests will be required within each of the 12 or 13 forest regions specified in the McSweeney-McNary Forest Research Act. Their areas will range from about 1,500 acres to about 5,000 acres, averaging about 3,500 acres, exclusive of the lands to be reserved as natural areas. They will not be so large as to impose any unnecessary burden of administration. Size will be governed primarily by the complexity of the type and by the growth rate of the tree species. The simpler the type and the higher the growth rate the smaller the area that will be required. In a subregion where it is not possible to find a satisfactorily representative single area it may be preferable to establish, as one unit, two or even three separate areas within easy working distance of the same headquarters.

For a natural area 1,000 acres is regarded as the minimum desirable under average conditions. The acreage will vary with the type of forest involved or, possibly, with climatic and topographic conditions. About a dozen such areas will be required in each forest region.

Where areas suitable for experimental forests or natural areas can not be found on existing national forests, consideration will be given to the possibility of acquiring suitable areas by gift or exchange, or, as a last resort, by purchase.

Experimental ranges will be established under the same principles as experimental forests.

On the experimental areas scientific and educational uses are to be dominant, commercial utilization and public occupancy subordinate. On natural areas commercial use will be prohibited and public use will be restricted as far as practicable. For convenience of administration and protection the areas will remain essential parts of the national forests on which they are situated, but responsibility for their management and use will rest wholly with the directors of the forest experiment stations. The boundaries of the natural areas and the principles to govern their management are to be established by the Forester and are not to be modified except with his approval.

While natural areas will be established primarily to meet the needs of the Forest Service, their use by other research or educational agencies for purposes which do not conflict with Forest Service projects will be allowed under appropriate cooperative agreements approved by the Forester.

The readiness with which title to lands can be established under certain of the public-land laws gives rise to some uncertainty at present as to the ability of the Forest Service to safeguard the integrity of the experimental forests and ranges and the natural ar from adverse occupancy and use; but it is believ that as soon as the system has taken definite form a its vital importance to public welfare is established a recognized Congress will make legislative provision preserving the areas permanently.

The reference in the regulation to primitive ar repeats the language of an earlier regulation un which a comprehensive system of primitive areas now taking form on the national forests.

Intermountain Forest and Range Expe ment Station Established

On July 1 the Great Basin Range Experiment S tion, Ogden, Utah, became the Intermountain For and Range Experiment Station. Increased app priations for the fiscal year 1931 made possible t addition of silvicultural investigations to the ran experiments carried on by the Forest Service in t intermountain region. C. L. Forsling, since 19 director of the Great Basin station, is director of t enlarged station. Lyle F. Watts, who was assign to the Great Basin station in 1929 as senior silvic turist, is in charge of the silvicultural section. Hea quarters are at Ogden.

Experimental Area Set Aside on All gheny Forest

A tract of about 1,800 acres within the Alleghe National Forest, Pa., has been dedicated to resea purposes and will be used by the Allegheny For Experiment Station, Philadelphia, for experime principally in methods of cutting. The area is abo 4 miles south of Kane, Pa., on the road from Lam to Wilcox. Its forest growth is believed to be rep sentative of the northern hardwoods type as the ty occurs in western Pennsylvania, and includes excellent representation of size classes. More th one-third of the area bears trees merchantable at le for chemical wood and pulpwood. A portion of cut-over land has been badly burned. The locat is easily accessible and is unusually advantage with respect to markets.

Ocala Game Refuge Created

A presidential proclamation of July 24 create game refuge of about 70,000 acres in the southern p of the Ocala National Forest, Fla. The wild life the locality includes a strain of the white-tailed d that is peculiar to Florida. Ancient sand dunes co pose the soil of the newly established refuge. timber is of the Florida scrub type, consisting prima of sand pine and, as an understory to the pine, a hea growth of live oak and other evergreen oaks. La are numerous, but because of the sandy nature of soil there are very few flowing streams.

rdling Unmerchantable Hardwoods Stimulates Growth of Associated Pulpwood Species

By M. WESTVELD, United States Forest Service

That pulpwood production on lands supporting a xed growth of spruce and hardwoods can be in- ased from 3 to 5 fold through girdling of the hard- ods is indicated by results on a series of experi- ntal plots established by the Forest Service at rbin Park, N. H., in 1905.

On plot 1 more than 90 per cent of the hardwood nber was girdled; on plot 2, 50 per cent. Plot 3 s left undisturbed. The material released was uce reproduction from 2 to 6 feet in height. Re- asurement in 1927 showed that on plot 1 the ume of spruce per acre was 902 cubic feet, or approx- ately 10 cords, whereas on plot 3 it was 158 cubic t, or less than 2 cords. (The spruce was not yet ge enough to be merchantable as pulpwood.) The erage annual growth of spruce on the heavily dled plot was one-fourth cord per acre during the riod 1905–1920; in the period 1925–1927, it was a l cord per acre. Between the same two periods the erage annual growth per acre of spruce on the oderately girdled plot rose from one-sixth cord to e-half cord. In 1927 the ungirdled plot was pro- cing less than one-tenth cord of spruce per acre per ar.

At the present rate of growth it is estimated that 1945, 40 years after treatment, the heavily girdled ea will yield about 30 cords of spruce per acre, which $4 per cord represents a stumpage value of $120 r acre, and that at that time the volume of spruce the untreated area will be only 4 cords, worth $16, r acre. Girdling charges at 5 per cent compound erest over this period will amount to $14.76, leaving net gain on the girdled area of approximately $105 r acre.

Much of the pulpwood in the Northeast is obtained om stands in which spruce is growing in mixture th hardwoods that owing to their low quality and accessibility are not merchantable. When the erchantable spruce and fir have been cut the develop- ent of young growth of pulpwood species is hindered the oppressive shade of the hardwoods. Girdling, costs ranging from $1 to $2 per acre, is an effective d inexpensive method of correcting this condition. general, girdling should be restricted to hardwoods poor form or quality and to trees that are suppressing owth of pulpwood species. Younger, more thrifty rdwoods should not be girdled except on areas ere the prospects of a profitable future market for rdwoods are decidedly remote.

The earliest and largest returns, of course, will be tained by girdling worthless hardwoods that are ertopping trees already of merchantable size.

The plots at Corbin Park were established in a stand of the class offering the least attractive prospects as to financial returns from girdling. In such stands from 40 to 50 years must elapse before the pulpwood crop can be harvested and returns on the investment realized. That a profit from girdling hardwoods in stands of this character may be expected at the end of some such period is clearly demonstrated by the results shown on the plots at the end of 22 years.

Practical Instrument Devised for Measuring Moisture Content of Wood

An electrical instrument suitable for industrial use for measuring the moisture content of wood has been designed and constructed by the Forest Products Laboratory. For four years the laboratory has been endeavoring to produce a simple device of moderate cost that would facilitate producing, distributing, and installing lumber in the desired conditions as to moisture content.

To distinguish it from others the laboratory designates the new instrument the "blinker" machine. The indicator consists of two neon bulbs, of which one flashes at a standard rate and the other flashes at a rate determined by the moisture content of the wood being tested. The second bulb flashes more frequently than the first if the wood is more moist than the standard for which the instrument is set, and less frequently than the first if the wood is drier than the standard. Contact with the wood is made by means of needle points built into a driving hammer. The machine is practically instantaneous in its operation. Head phones giving a gentle click may be substituted for either or both neon bulbs. Not only does the machine make it possible to sort lumber according to whether its moisture content is above or below a selected standard, but by dialing the test flash into approximate time with the standard flash it is possible to determine definitely what the moisture content is. The "blinker" instrument's range is approximately from 8 per cent to 24 per cent moisture content. It is accurate to about 1 per cent moisture content. The instrument has the merits of compactness and portability.

* * *

A 15-year study of Douglas fir seed production on the Pike National Forest, Colo., concluded in 1927, indicated that the average annual production of good seed was about 43,000 per acre. Heavy crops occurred approximately every three years.

* * *

In a recent sale of 1,000 cedar poles on the Kootenai National Forest, Mont., poles 35 feet long or longer brought 6.3 cents per linear foot. In a sale of 5,400 poles with a hauling distance of about 15 miles, poles 35 feet long or longer brought 5¼ cents per linear foot.

Federal Forestry Appropriation Increases for 1931

Appropriations available to the Forest Service in the year beginning July 1, 1930, exclusive of the forest road and trail appropriations, receipt funds, and special items, total $15,859,230. This represents an increase of $2,734,950 over the appropriations for the preceding fiscal year. Forest fire protection claims most of the increase; $1,500,000 is added to the improvement appropriation for constructing and maintaining fire-protection roads and trails, $306,000 to that for constructing other fire-protection improvements on the national forests, and $295,000 to the fund to be allotted among the States cooperating with the Federal Government in protecting State and privately owned forest lands from fire. In addition an increase of $25,000 has been made in the special appropriation for fire-protection improvements on four national forests in southern California. An increase of $188,500 is made in the amount available for employing additional forest guards and procuring fire-fighting equipment. Increases in other national-forest administrative allowances are as follows: $15,000 for constructing and maintaining range improvements; $25,000 for control of forest insects; $25,000 for control of white-pine blister rust in northern Idaho; $20,500 for administering timber-sale business; $15,000 for forest planting; and $20,000 for administering and protecting lands being purchased for national-forest purposes. A $10,000 increase has been made in the amount available for allotment to States cooperating with the Federal Government in the production and distribution of forest planting stock.

For forest road and trail construction and maintenance in 1931 the regular appropriation act provided $7,500,000. The second deficiency act of 1930 provided an additional $3,500,000 for such use during 1931. (Permission to obligate during 1931 for national forest road construction the additional $5,000,000 authorized by the Colton-Oddie Act was also included in the second deficiency act.)

For Forest Service research projects authorized by the McNary-McSweeney Act an increase of $258,500 has been allowed, distributed as follows:

Forest management research:	
California Forest Experiment Station—	
Determination of best methods of preventing and suppressing forest fires	$20, 000
Determination of best methods of cutting and of reforestation for California redwoods	10, 000
Intermountain Forest and Range Experiment Station—	
Study of methods of cutting in western yellow pine type	10, 000
Forest management research—Continued.	
Southern Forest Experiment Station—	
Investigation of relationship between fire and resin yield in naval-stores operations	$10, 0
Investigation of methods of cutting to insure natural reforestation in second-growth southern yellow pine stands	10, 0
Investigations concerning southern hardwood forests	10, 5
Appalachian Forest Experiment Station—	
Forest research in northern Georgia	5, 0
Range investigations:	
Southwestern Forest and Range Experiment Station—	
Study of water requirements of range livestock and relation of stock watering to western yellow pine reproduction	8, 0
Intermountain Forest and Range Experiment Station—	
Study of problems of restoring depleted winter or desert ranges	10, 0
Forest products investigations:	
Naval-stores research looking to increase in yields and reduction in costs of production	15, 0
Development of processes for producing light-colored papers from Douglas fir and other western species	10, 0
Investigation of chemical and physical properties of lignin	10, 0
Investigations at Forest Products Laboratory of pulp-production possibilities of softwoods	15, 0
Forest survey:	
Extension of work in Pacific Northwest, as part of activities of Northwestern Forest Experiment Station, on survey of present and future requirements for forest products, present and potential timber growth, volume and quality of existing timber, and area and condition of forest lands	50, 0
Initiation of survey in southern hardwood regions, particularly in lower Mississippi bottom lands	25, 0
Cooperative assignments with outstanding, closely related State surveys	10, 0
Forest economics:	
Investigations of practical measures for furthering the practice of forestry on privately owned lands and stopping forest devastation	25, 0
Extension of forest taxation inquiry	5, 0

A special item in the appropriation act provid $100,000 for constructing and equipping buildings f

Forest Products Laboratory and authorizes the retary of Agriculture to incur obligations not to eed $800,000 for this purpose.

Appropriations for 1931 give the Bureau of Biological vey an increase of $29,597 for control of injurious ents, mainly on the national forests, and one of ,000 for studies of the occurrence, distribution, and its of wild life in their relation to forest production. e Bureau of Entomology has an increase of $10,210 enlarging investigations in the control of bark tles in the Western States, and the Bureau of Plant lustry has one of $10,000 for forest pathological rk at the Allegheny Forest Experiment Station, including studies of root diseases and decay fungi. For operation of the National Arboretum in 1931 an propriation of $30,000 is available.

oung Douglas Fir Forest Shows Gain from Thinning

Ten years after an experimental thinning operation a plot of young Douglas fir forest at Stabler, Wash., the Wind River Valley, trees more than 4 inches diameter were two and one-half times as numerous the thinned plot as on a neighboring plot that was thinned. The thinning operation was carried out the fall of 1919 by foresters of the Pacific North-st Forest Experiment Station in a stand that orig-ted in 1910 after a spring slash burn. It left only minant trees, spaced approximately 8 by 8 feet. the fall of 1929 the average diameter of the trees s one-half inch greater on the thinned than on the hinned plot, and the basal area of the thinned nd had increased from 41 per cent to 58 per cent that of the unthinned stand. The average height the trees that had been liberated by thinning was se to that of the tallest 500 trees in the unthinned nd.

On a third plot, thinned in 1919 to an exact 8 by foot spacing regardless of dominance, diameters wed hardly any superiority to those of the best trees on the check plot in 1929, and average height s not far from the average height of all the trees in unthinned stand. The basal area on this plot had reased from 15 per cent to 30 per cent of that on check plot.

These plots include approximately 0.75 acre each.

The favorable effect of thinning on growth was rtly offset by increased limb development of trees the thinned plots.

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The California Forest Experiment Station has moved o Giannini Hall, the building newly erected on the mpus of the University of California, at Berkeley, lif., with funds from an endowment created by A. Giannini. The station was formerly quartered in the iversity's Hilgard Hall.

Soils Studied on Old-Growth Hardwood Areas

Examining 26 hardwood forest areas in Ohio that have remained in a virgin condition or have been only slightly disturbed, J. T. Auten, silviculturist of the Central States Forest Experiment Station, found no forest litter more than an inch deep. In all cases, litter of the third year preceding the examination had disintegrated into fine particles. Another condition noted was the porosity of the lower horizons. Close examination showed that this was due to root penetration; in many soil samples tubes formed by the outer cortex of deep-striking rootlets were found intact. On one site the soil was found to be porous at a depth of 72 inches. Comparison of the upper 9 inches of mineral soil on two forest sites with the soil of adjacent cultivated fields showed that the former was in one case 9 per cent and in the other case 14 per cent more porous than the latter.

Northern White Pine Seed Germinates Better After Exposure to Low Temperatures

Northern white pine seed can be sown in the spring as advantageously as in the fall if it is subjected to cold and moisture for a few weeks before sowing, according to the results of tests carried out by the Lake States Forest Experiment Station. If sown in the spring without special treatment, seed of this species germinates slowly and irregularly, some of the seedlings deferring their appearance until late summer or even until the second year. Fall sowing, although it results in less irregular germination, involves greater danger of the seed being eaten by rodents. For the low-temperature cycle preparatory to spring sowing the station recommends that the seed be mixed with slightly moist screened sand or sawdust and subjected for 30 days to temperatures between 32° and 50° F. When sawdust is used it is less difficult to separate the seed for sowing. The seed is separated from the stratifying medium by means of a screen. Before this separation is attempted the mixture may be slightly dried, if the seed is to be sown immediately.

These recommendations are based entirely on laboratory tests, no properly executed nursery test having as yet been made by the station.

In the fall of 1928 the station gave several different kinds of treatment to lots of freshly collected northern white pine seed that had been extracted with the utmost care. None of these lots germinated more than 40 per cent, and in all cases germination was slow and straggling. Samples of the same seed that were stored for one year (until December 9, 1929), then soaked overnight in 0.2 per cent sulphuric acid and sown immediately, germinated nearly 56 per cent in the first 44 days after sowing, and 58 per cent within 72 days. No definite distinction as to superiority in germination could be made among lots of seed that were sealed in bottles and stored at an even temperature of 32° F., in a cellar with a yearly temperature range of about 30° to 60° F., and in a shed with a temperature range of about 20° to 100° F. Seed stored in the shed without being sealed air-tight was about 10 per cent inferior to the other lots. Seed stored with a moisture content of 7 per cent gave better results than seed stored with a moisture content either greater or less.

The storage conditions described as having given good results in these tests may not represent the best conditions for storage for periods of more than one year; they may have been more effective in making the seed ready for germination at the end of a single year than in preparing it to retain its vitality beyond that period.

Irrigation Greatly Increases Growth Rate of Florida Pines

In experimental plots of longleaf pine on the Choctawhatchee National Forest, Fla., irrigated trees and trees both irrigated and fertilized have shown an average increase of 104 per cent in rate of growth in the three-year period 1927–1929 as compared with the three-year period before irrigation and fertilizing were begun in the spring of 1927. The growth-rate increases of individual trees in the test plots ranged from 5 per cent to 504 per cent. In the check plot the growth-rate increase in 1927–1929 averaged 18 per cent, the change in growth rates of individual trees ranging from −10 to +27 per cent. Application of both water and fertilizer did not result in greater increase of growth rate than the application of water alone. This is thought to be accounted for by the sandy nature of the soil, which, according to soil analyses, is very unretentive of the fertilizer applied. The average increase in rate of growth of summerwood was 15 per cent for irrigated trees and trees that were bo irrigated and fertilized, as compared with 18.9 p cent for trees in the check plot.

"Forest or Wasteland" Film Releas

A three-reel Forest Service motion picture h recently been released under the title "Forest Wasteland." The film illustrates the widespread r duction of forest lands to an unproductive conditi through fire and other causes and shows methods b which forest land may be restored to productivity. includes unusual "shots" of primitive forest areas a of forest fires. The film may be borrowed through t Forest Service or directly from the Office of Moti Pictures, United States Department of Agricultu Washington, D. C., the borrower paying transportati charges.

* * *

Data on second-growth chestnut oak (*Quercus mo tana*) collected by several of the Federal forest expe ment stations indicate that a 5-inch tree commor has 30 per cent of its volume in bark. When the tr has grown to a diameter of 20 inches bark may co pose 15 to 20 per cent of its total unpeeled volun These figures are for the stem exclusive of branches.

* * *

The name "Charlton Flat" has been given by t United States Geographic Board to an open area with the Angeles National Forest, Calif., in memory of t late R. H. Charlton, who was supervisor of the Ange Forest from 1905 to 1925. The area is in the southea part of T. 3 N., R. 11 W., near Pine Mountain.

General Forest News

Dutch Elm Disease Found in America

By Haven Metcalf, United States Bureau of Plant Industry

The Dutch elm disease was found in the United States this summer for the first time. Curtis May, of the department of botany and plant pathology of the Ohio Agricultural Experiment Station, at Wooster, Ohio, isolated Graphium ulmi, the fungus causing this disease, from four wilting American elm trees at Cleveland and from one at Cincinnati. Christine Buisman, a visiting plant pathologist from Holland who has worked for some years on this disease in Europe, also identified as Graphium ulmi the cultures she made from one of these trees. The Office of Forest Pathology, Bureau of Plant Industry, is cooperating with the Ohio State authorities in the identification work Wooster and in scouting. So far no common cen has been found from which the disease has spread this country.

The Dutch elm disease was first observed in Holla in 1919 and has since been found in England, Fran Belgium, Germany, Austria, and Norway. Graphiu ulmi develops principally in the sapwood. Wilti and dying of the leaves of one or more branches of the entire tree, and dark streaks in the sapwo constitute the characteristic field symptoms of t disease. The disease strikingly resembles the we known Verticillium wilt of maple. Scouting for presents many difficulties because of the wilting elms from other causes. The affected trees sometim

quickly, but usually last for two or three years
r the first wilting is observed.
n Europe the Dutch elm disease is considered very
tructive. It is, of course, impossible to predict
it will behave in the United States. Probably
American species of elms are susceptible; the valu-
Ulmus americana certainly is.

rest Management Pays its Way on Property of Bates College

o R. E. Rendall, of Alfred, Me., goes the credit for
ing made forest management pay for itself on 12,000
es of poorly stocked forest land belonging to Bates
lege. This land, scattered over 11 towns in York
nty, was bequeathed to the college by B. C.
dan in 1912. In the next few years much of it was
ged. By 1921, when Mr. Rendall was employed as
nager, its timber resources were badly depleted. The
ise with which he began his management of the
st disclosed only about 11,000,000 board feet of
rchantable pine and about 2,000,000 board feet of
dwood, mostly oak.

esides this merchantable timber there were con-
rable quantities of inferior hardwoods. To this
gely neglected resource Mr. Rendall, a forester
ined in the University of Maine and in the Yale
hool of Forestry, gave particular attention. By
eful study he discovered markets for fuel wood to be
d for domestic purposes and in brick kilns, which
bled him to sell the inferior wood for from $1.50 to
a cord. In the same markets he disposed of much of
slash produced by his saw-timber operations, thereby
noving a fire menace without expense and in some
tances with financial profit.

he trustees of the college wished the forest to pay
own expenses from the start, but agreed not to
ect any net revenue in the first 10 years. The
rges, including taxes, protection and improvement
ts, Mr. Rendall's salary, and an annuity payable to
of the donor's heirs, amount to $1 per acre per year.
the eight years since Mr. Rendall became manager
the forest these charges have been met from forest
eipts.

The marketing of inferior hardwoods that has been
secret of financial success in this forest-management
ject has helped also to make the project a technical
cess, since it has resulted in liberating pine and
ner valuable softwoods. A very moderate cutting
pine timber has resulted in desirable thinning.
her features of management are improvement
tings, pruning, and planting. (Mr. Rendall raises
e planting stock in a small nursery on the property
d in some years has made money by selling nursery
ck.) In eight years' time these measures, together
h fire protection, have had a marked effect on the
est's condition and prospects. A second cruise
made in 1928 showed that the merchantable stand had increased by 2,500,000 feet.

Four men are steadily employed on the forest and additional help is employed temporarily.

Unlike the usual college forest, the Bates Forest is not dedicated to educational or research purposes but is simply a piece of college property from which an income is expected. It nevertheless constitutes a striking demonstration of the possibilities of practical forest management.

Hummel-Ross Corporation Encourages Farm Forestry

By W. L. Gooch, Forester, Hummel-Ross Fibre Corporation

The Hummel-Ross Fibre Corporation, Hopewell, Va., is buying from farmers and small landowners upwards of 40,000 cords of loblolly and shortleaf pine pulpwood per year. This wood comes from within a 40-mile radius of Hopewell and is delivered to the plant by wagon or truck. Any quantity of wood from one cord up is accepted, and payment is in cash. This cash market for pulpwood has been a great help to farmers in their present rather bad economic situation. If a farmer has a bit of trading to do in town he brings in a load of wood, gets his cash, and then does his buying. As for the company's side of it, this farm-cut wood is cheap wood; the cost of transportation has been eliminated, also the cost of field supervision and the contractor's bonus formerly paid when wood was bought through agents 50 to 100 miles from Hopewell and shipped in by rail.

The company is interested in keeping near-by forest lands growing pine. Other things being equal, in the years to come the wood cut from these near-by forest lands should be the cheapest wood available, since the transportation factor is largely absent. So the company, through its forestry department, is offering the farmers in the vicinity advice on right methods of cutting pine for pulpwood and demonstrations of such methods. These farmers are learning the value of leaving seed trees and some of them are systematically thinning their pine stands, removing the poorer trees where these are suitable for pulpwood and otherwise improving the growing condition of the better trees in the stand. The company feels that this service given to landowners in the vicinity of Hopewell will in a measure obviate the necessity of its purchasing and owning larger areas of timberland in order to assure its raw material requirements in the years to come. It now owns some 8,000 acres. If the same kind of forest and land management is given to the other privately owned forest lands in the vicinity of the plant as the company gives to the lands it owns, much the same results will be realized years hence in the way of having cheap pulpwood available without the necessity of the company's tying up working capital in an extensive land-purchase program.

Southern Pacific Helps Fight Forest Fires

By H. Pollard, General Fire Inspector, Southern Pacific Co.

A considerable portion of the Southern Pacific Co.'s 9,000 miles of railroad lines on the Pacific coast operate through heavily timbered country in the Sierra Nevada, Cascade, Siskiyou, and Tillamook Mountains of California and Oregon. To cooperate with the Forest Service in protecting these forests, as well as to safeguard its own property, the railroad maintains an extensive fire fighting organization. Fire chiefs, fire brigades, and fire companies are located at principal points in the six western States through which the railroad operates. In addition to extinguishing fires it is the duty of this organization to see that shop, yard, and track forces practice "good housekeeping" and that the premises are kept clear of rubbish and inflammable materials. The men charged with the responsibility of holding fire losses to a minimum act on the theory that it is better to prevent a fire than to fight one.

All locomotives operating through the timber country are equipped with devices for preventing the escape of sparks from smokestacks. In addition each locomotive is equipped with an inspirator and 100 feet of 2-inch rubber-lined hose, thus becoming a fire-fighting unit. Fire guards 6 feet wide are plowed on each side of the track, and at the approach of summer the remainder of the right of way is cleared of dry grass by burning, under the watch of section gangs. On the heavy mountain grades, where hard application of brakes is necessary, a close watch is kept for fires due to sparks created by friction, although these sparks seldom cause damage. Through the forest country a man on a motor car, equipped with a pack tank full of water, follows close behind each train. He can quickly extinguish any small blaze. When his motor car falls far behind the fast-moving train another watchman picks up the "trail."

Cooperating further with the Forest Service, the Southern Pacific instructs all its train and engine crews and other employees working in the timber country to be constantly on the lookout for signs of fires, and by means of placards conspicuously posted in all trains warns its passengers of the danger of throwing matches or burning tobacco from car windows and observation platforms.

The most unusual feature of the railroad's activity in fire protection has been the establishing of a lookout station on the top of Red Mountain in the Sierra Nevada, where a watch is maintained night and day during the summer months. A stone cabin on this peak commands a view of several hundred miles of the Sierra region. The primary function of the lookout is to detect fires in or adjacent to the 18 miles of wooden snowsheds which cover the railroad tracks at their highest elevation. These expensive sheds provide the means of keeping the tracks clear of snow during the winter, but in the summer they are constantly su ject to damage by fires due to the operation of trai through them. Installed in the lookout cabin on R Mountain is an ingenious device that enables t observer to determine within 100 feet the location any column of smoke that he may detect, even if t smoke is 4 or 5 miles away. To an ordinary enginee transit is rigidly attached an aluminum indicator th moves over a circular chart on which is etched, copper, a line representing the exact outline of t snowsheds. On the chart is shown also the locatio in relation to the sheds, of all stations, mile posts, a fire-alarm and telegraph boxes. When the observ sees smoke he is able, by means of the telescope tran and the etched chart, to determine whether the fire in the sheds or in the forest and what is the neare point from which fire-fighting equipment can be d patched to it. Telephone connections enable the loo out to send out the alarm to railroad and Forest Serv forces.

For the immediate protection of the snowsheds fo specially equipped fire trains are stationed at strate points along the railroad line in the mountains. T locomotives of these trains are equipped with dup pumps having a capacity of 300 gallons per minu To each locomotive are attached two tank cars with combined capacity of 12,500 gallons. Each train equipped also with 1,000 feet of 2½-inch standa fire hose, two chemical extinguishers, two fire ladde a portable telephone, and a large supply of brush hoo axes, shovels, saws, and lanterns. The long hose mak it possible to fight fires in timber at a considera distance from the tracks. Two movable nozzles attached to the front of the locomotive, and each tra can throw four streams of water at one time. T engines are equipped with sirens. These trains kept constantly under steam during the summer mon and require only from two to five minutes to get un way. While on the way to fires they are given right of way over other traffic. Fire trains can be se from two directions, so that a fire may be fought fr both ends. It is the proud record of the fire-train cre that they have never yet had to back away from blaze, and the losses have been measured only by time required to get the trains to the scene of the fi

To insure further against fire in the wooded coun the company has 50 tank cars distributed at strate locations on spur tracks. These cars are specia equipped for emergency use. They are tested onc week. Piping of each car is arranged so that a dup pump can be operated with steam furnished by locomotive. Each car has 500 feet or more of 2½-in hose and is fully equipped with fire-fighting tools.

The Southern Pacific has more than $120,000 inves in its fire trains, lookout station, electric alarm syste and other fire-protection facilities in the timber count aside from its equipment for combatting fires at its t minal plants, general shops, and water-front propert

nerican Tree Planters Reforest 111,175 Acres in 1929

n the calendar year 1929 tree planters of various
sses reforested 111,175 acres of land in the United
tes, according to figures compiled by the United
tes Forest Service. This total includes 2,084 acres
and in Hawaii and 1,534 acres in Porto Rico. Plan-
ons established during the year by States and Ter-
ries totaled 31,430 acres, and those established by
Federal Forest Service totaled 18,207 acres.
als for other agencies were as follows: farmers,
825 acres; other individuals, 3,650 acres; munici-
ities, 5,920 acres; schools and colleges, 539 acres;
ustrial organizations, 25,088 acres; and other
anizations, 1,516 acres. Of the total area planted
industrial organizations 10,060 acres is credited
pulp and paper companies, 8,732 acres to lumber
npanies, 3,189 acres to water and power companies,
61 acres to mining companies, 100 acres to railroad
npanies, and 1,446 acres to other organizations.

The largest total area reported to have been planted
ing the year in any one State was the 27,820 acres
nted by various agencies within the boundaries of
chigan. For New York the year's total was 21,135
es; for Louisiana, 10,583 acres; for Pennsylvania,
18 acres; for Washington, 4,400 acres; and for
ssachusetts, 3,938 acres. In Ohio and in California
total acreage planted during the year was more
n 3,000.

At the end of 1929 the cumulative total of the forest
ntings in the United States of which the Forest
vice has record was 1,653,308 acres. This includes
,385 acres of national forest land planted by the
leral Government, 200,553 acres of land planted
States and Territories, 46,282 acres planted by
nicipalities, 193,262 acres planted by industrial
anizations, 917,276 acres planted by farmers and
er individuals, and 5,215 acres planted by schools
l colleges.

lpwood Cutting Tests on Finch-Pruyn Land

At the request of Finch, Pruyn & Co. the North-
stern Forest Experiment Station is cooperating in
establishment of a series of plots on land owned by
company near Newcomb, N. Y., on the banks of
Hudson River, for experiments in methods of cut-
g pulpwood. The purpose of the experiments is to
termine the feasibility of making the interval
tween successive cuts of pulpwood on a given area
rt enough to permit utilization of all the growth
d to eliminate the loss from windfall and decay that
inevitable when a period of 50 years or more inter-
nes between cutting operations. Each of the experi-
ntal plots will be 30 acres in area. The series will
nsist of five plots, including a check. The Cornell
niversity forestry department, which maintains its summer camp on lands owned by Finch, Pruyn & Co., will cooperate in tallying sapling growth and reproduction and in sampling soil and making studies of soil changes following cutting.

Relation Between Soil Acidity and Root Diseases of Forest Trees

By Carl Hartley, United States Bureau of Plant Industry

Continued observations and further experiments with soil treatments have confirmed for pines, spruces, and Douglas fir the theory stated in United States Department of Agriculture Bulletin 934, published in 1921, that soil acidity is unfavorable to damping off. While there are some exceptions, in general it has been found that the forest nurseries in which damping off is most troublesome are those in which the soil is least acid. It is presumably for this reason that damping off has been more troublesome in the drier parts of the West than in the more humid East and South. Application of lime increases the liability to damping off, while at most nurseries strong acids and aluminum sulphate (which is an acidifying material) help to prevent it.

Damping off, the group of diseases which result in rapid decay of succulent young seedlings or soft cuttings, is essentially a root rot. Even in attacking the youngest seedlings it usually enters through the root. Some of the damping-off fungi are able to continue to injure the root caps of trees when the trees have become too old to be killed by them. This sort of injury is known to extend at least through the third year in the nursery, and the killing of root tips in the forest has been observed frequently enough to lead to the supposition that the damping-off fungi work to a greater or less degree on the youngest roots of trees of all ages. Much remains to be learned both as to the prevalence of this rootlet rot and as to its effect on growth rate and drought resistance. For Douglas fir at least it has been shown that rootlet rot can dwarf nursery trees so as to make them of little value for planting purposes, and that this acute injury is related to lack of acidity in much the same way as damping off.

So far as I know no study has been made in this country of the relation of soil acidity to the wood-destroying types of root-rot fungi; but Doctor Hesselman has informed me that in Sweden Fomes annosus is more active in the less acid soils.

A study of the relation between soil acidity and root troubles is now being made by L. W. R. Jackson at the Allegheny Forest Experiment Station. In the meantime it seems reasonable to suppose that much of the disease loss in forest nurseries, including loss primarily due to root fungi and also loss primarily due to drought, has been incurred by growing forest trees on agricultural rather than forest soils, under conditions which are abnormal because the soil is less acid and the stand more dense than in natural reproduction in the forest.

Federal Purchase of Bird Refuge Areas Approved

Government purchase of a 32,555-acre tract in South Carolina and a tract of 5,180 acres in Colorado as migratory-bird refuges has been approved by the Migratory Bird Conservation Commission. These areas will constitute the first refuges acquired by purchase under the Federal migratory bird conservation act of 1929, by which Congress authorized the expenditure of nearly $8,000,000 for surveys and acquisition of lands for bird refuges. The commission's action was based on recommendations of the Bureau of Biological Survey, which had examined the areas and found them especially well adapted to serve as bird refuges.

The South Carolina unit is in the Cape Romain region, Charleston County, on the Atlantic seaboard; the Colorado unit is in the San Luis Lake region, Alamosa County. South Carolina has facilitated acquisition of the Cape Romain unit by granting to the Federal Government control of all State lands in the proposed refuge that are between the high and low water marks.

The average price approved by the commission for these lands is $1.13 per acre.

Wood Preservative Industry Grows in 1929

In 1929 the number of plants in active operation in the United States giving preservative treatment to wood increased by 10, and the quantities both of wood treated and of preservatives used by such plants were greater than in any preceding year. The number of plants in operation was 203, including 131 of the pressure cylinder type, 56 of the nonpressure (open-tank) type, and 16 equipped for both pressure and nonpressure treatment. The total number in existence was 213, of which 150 were commercial plants treating wood for sale or by contract, 33 were owned and operated by railroads, and 30 were the property of public utility corporations, mining companies, or Government agencies.

Information furnished by all the plants to the American Wood-Preservers' Association and the United States Forest Service has been compiled by R. K. Helphenstine, jr., for the twenty-first annual report published by these agencies on the quantities of wood treated and preservatives used in the United States.

The total quantity of wood treated in 1929 was 362,009,047 cubic feet, or nearly 8 per cent more than was treated in 1928. Of this total 90 per cent was treated by pressure processes. Poles showed a larger increase in quantity treated than any other class of material, 12,828,341 cubic feet. Piles registered the next largest increase, 3,461,400 cubic feet. Wood blocks and crossties showed increases of 3,175,818 cubic feet and 2,726,094 cubic feet, respectively. The quantities of materials of different classes treated by the plants and of preservatives used by them during th years 1928 and 1929 were as follows:

	1928	1929
Material treated:		
Crossties—		
Hewed (number)	38, 323, 854	39, 538, 1
Sawed (number)	31, 790, 551	31, 484, 9
Total (number)	70, 114, 405	71, 023, 1
Switch ties (board feet)	174, 401, 401	173, 107, 6
Piles (linear feet)	20, 206, 112	25, 324, 2
Poles (number)	3, 654, 885	4, 383, 7
Wood blocks (square yards)	1, 400, 500	2, 610, 3
Construction timbers (board feet)	241, 892, 969	242, 445, 7
Cross arms (number)	1, 948, 228	3, 158, 1
Miscellaneous (board feet)	96, 129, 282	134, 635, 3
Preservatives used:		
Creosote—		
Domestic [1] (gallons)	140, 671, 196	134, 063, 6
Imported (gallons)	82, 154, 731	92, 310, 5
Total (gallons)	222, 825, 927	226, 374, 2
Petroleum (gallons)	25, 075, 903	29, 656, 1
Zinc chloride (pounds)	23, 524, 340	19, 848, 8
Miscellaneous—		
Salts (pounds)	443, 308	1, 188, 1
Liquids (gallons)	417, 953	38, 4

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[1] Including 57,914,236 gallons of distillate coal-tar creosote, 74,828, gallons of creosote coal-tar solution, 569,491 gallons of water-gas tar, a 751,670 gallons of water-gas tar solution.

Of the crossties treated by the plants in 1929, 3 per cent were oak, 24.8 per cent were southern pi and 10.8 per cent were Douglas fir. More than 64 p cent of the crossties were adzed or bored or both bef treatment.

In general, lower prices were paid for preservatives 1929 than in 1928.

❦

Reports to the Bureau of the Census indicate decrease of one-half of 1 per cent in the 1929 lumber c of 732 mills which in 1928 sawed 51.5 per cent of t total lumber cut reported to the bureau for that ye The 1929 cut of these mills, each of which saw 5,000,000 board feet or more either in 1928 or in 19 totaled 17,498,274,000 board feet.

ee Planting to Honor George Washington

'he George Washington Bicentennial Commission
made the planting of memorial trees and forests
ature of the program for celebrating in 1932 the
hundredth anniversary of the birth of George
shington. This phase of the program has been
rusted by the commission to the American Tree
ociation. The association suggests that the trees be
ited this fall or next spring, so that they may
ome firmly rooted before the time for their dedica-
arrives. A copy of a Bicentennial Tree Planting
k containing planting advice will be mailed to
one who sends a request for it to the American Tree
ociation, 1214 Sixteenth Street NW., Washington,
C.

re-Protection Results on Georgia Timberlands

'he Georgia Forest Service attributes to H. M. Wil-
vice president, Baldwin-Lewis-Pace Co., Jackson-
e, Fla., the following statement in regard to the
pany's management of 15,000 acres of land near
ckton, Ga.:

n the fall of 1926, after looking over several tracts of
woods land that had been protected from fire for
n two to four years, I became convinced that all
t was needed to establish a second growth of slash
ber on our place near Stockton, Ga., was protection
n fire. After consulting with my associates we
ded to place our tract of approximately 15,000 acres
er fire protection.

Ve immediately began construction of fire lines, and
plied ourselves with one-man water tanks, torches,
, for fire fighting.

Ve were working at that time 15 crops of faces on
of this tract and as we wanted to establish new
vth on the land on which these faces were being
ked, we decided to protect this land also and not
e the boxes at all.

Ve have not raked a tree for the past four winters
in that time we have had not more than 50 faces
ned out of an average of 16 crops per year worked
he place. In this connection we acknowledge with
ere appreciation the community cooperation we
e enjoyed.

he average cost of raking being $75 per crop, we
ed approximately $4,800 during the four years,
the total cost of our reforestation work on the
re 15,000 acres, including tractor and thinning,
not exceeded $5,000 to date.

he problem now facing us for economical solution is
best to thin the heavy growth of slash pine now on
ctically the entire tract.

his concern's holdings show slash pine 9½ inches and
nches in diameter 4½ feet from the ground, showing
nd 12 ring growth, with density of stand 14 to 15
between trees, or approximately 200 trees per acre.

onnell H. Stone, forester of the Pfister & Vogel
d Co., which owns approximately 66,000 acres of
l in Union and Towns Counties, Ga., is quoted by
service as follows:

The company employed a trained forester in 1913 and a definite policy of protection was established in 1915. A report made by timber cruisers had convinced the owners that 65 to 75 per cent of its lands were being burned annually, so the first lookout towers and telephone patrol system of the South were constructed on these lands in 1915–16, rangers and patrolmen being employed to direct the tenant fire wardens. A good tenant system was used instead of paid fire fighters, and free range privileges were included with other concessions in order to secure cooperation in the prevention of forest fires. As a result of these methods the average burned area per year has been less than one-tenth of 1 per cent from 1915 to the present time (1930). The owners are satisfied with this work as a paying investment, and are convinced that values in new growth more than offset the cost of protection and all carrying charges on the property.

Much-Thinned Pine Stand Superior in Volume

A 47-year-old stand of northern white pine at Durham, N. H., that has been thinned annually for the last 18 years now has a greater volume than a comparable unthinned stand containing more than twice as many trees, writes K. W. Woodward, forester of the University of New Hampshire. The first thinning removed about half the trees and later thinnings have been at the rate of 1 cord per acre per year. In 12 years the thinned plot increased 102 per cent in volume while the unthinned plot increased but 72 per cent. Average annual diameter growth is twice as great in the thinned as in the unthinned stand and the trees are taller, of better quality, and more thrifty.

Creosoted Piling Installed for Third Time After 38 Years' Service

Creosoted Douglas fir piling that had given 38 years' service in two installations on the California coast was installed this year for the third time when the Los Angeles Playground Commission rebuilt Sunset Pier, says the Wood Preserving News. The piling was pressure treated at the San Pedro plant of the Southern Pacific Co. in 1889. A pure coal-tar distillate was used and the piling was treated to refusal, with a final average retention of 14.17 pounds of preservative per cubic foot. It was used in 1891 and 1892 in building the Southern Pacific's long wharf at Santa Monica. In Santa Monica Bay the life of untreated or improperly treated timber is frequently a matter of months only, says the News. Marine borers are extremely active in the waters of the Pacific. Santa Monica Bay is not protected by irregularity of coast line, its mouth is wide, and the full force of heavy winter storms is felt along its shores. Yet when the wharf was dismantled in 1916 a very large percentage of the piling was found to be in excellent condition.

A number of the old piles were used in the foundations of one wing of Sunset Pier in the town of Venice, which is now within the corporate limits of Los Angeles. In 1929, when the Los Angeles Playground Commission rebuilt a section of this pier, some 60 of the old salvaged piles were removed. All but one of these proved sound and serviceable and were placed in the remodeled pier.

* * *

W. S. Taber, State forester of Delaware, writes that the Alnus maritima (seaside alder), the range of which within Delaware is given in Department of Agriculture Miscellaneous Circular 92, Check List of
Forest Trees of the United States, as "Nanticc
River near Seaford, Del.," is found in great abundar
on most of the water courses in the lower half of
State. He adds that the Pinus rigida serotina (po
pine), the range of which is given in the check list
the coast region from the vicinity of Cape May a
southeastern Virginia to Florida, occurs sparingly
Delaware from Lewes southward throughout the wa
courses of Rehoboth and Indian River bays a
tributaries.

Foreign Notes

Maté an Important Product of Brazil

Brazil produces each year about 200,000 metric tons of maté, the dried leaves of certain Ilex species used for making tea, according to a report by C. R. Cameron, American consul at Sao Paulo. In 1928 the Brazilian exports of maté were valued at $13,748,323, being exceeded in value only by exports of coffee, of hides, and of cacao. Argentina produces about 20,000 tons of maté annually, Paraguay about 12,000 or 15,000 tons. The drink prepared from maté leaves is used by many millions of South Americans and is now being introduced into the United States. It is mildly stimulating and contains a much smaller quantity of tannic substances than the tea of China.

About 20 of the 60 species of maté found in Brazil serve more or less satisfactorily for beverage purposes. The one most favored is Ilex paraguariensis, found principally in the basin of the River Plate from 18° south to about 30° south. In the forest this species attains a height of 50 or 60 feet. Usually the maté tree is absent from a belt 10 to 30 miles wide along any large river. It prefers depressions in the foothills and mountains and an altitude of from 1,500 to 2,500 feet. It is frequently associated with the Parana pine. At present important commercial forests of Ilex paraguariensis are found in southern Matto Grosso, central and western Parana, western Santa Catharina, and northwestern Rio Grande do Sul, all in Brazil. Others are found in eastern Paraguay.

The fully developed leaf of maté is preferred for harvesting, and the harvest usually takes place during the fall and winter, that is, from May to October. Cutting at intervals of 3 years is thought to result in a superior grade of the commercial product. The cut branches of green leaves are first toasted over an open wood fire and then thoroughly dried, usually on a framework of poles to which hot air is conducted through a subterranean canal from a fire built some distance away. The dried leaves are threshed and then, according to the best practice, are allowed
season for a few months.

Brazil has not yet developed commercial plantatic
of maté. The Argentine Territory of Misiones, ho
ever, is developing such plantations on a large sca
One of the great difficulties in establishing plantatic
is to obtain seedlings; the seed, being inclosed in
gelatinous covering and a stout epidermis, sprout ve
slowly. In Argentina the seed are scattered on a ve
finely pulverized seed bed, covered with 2 or 3 cen
meters of earth, and watered once a day, or oftener
dry weather. If the planting takes place in Mar
general germination normally occurs in September a
some seed continue to sprout until December. T
young plants must be carefully shaded, both in t
seed beds and after transplanting. The trees
pruned each year, but the first harvest is deferr
until they are 4 years old.

Australia Cuts Down Estimates of I Forested Area

The forest area of Australia was estimated in 1
at 107,000,000 acres, or 5.62 per cent of the total a
of the continent, C. E. Lane-Poole, inspector gene
of forests, stated in a paper published in the Decemb
1929, Australian Forestry Journal. By 1921
official estimate had dropped to 72,000,000 acres, a
in 1922–23 it sank to 24,500,000 acres, or 1.29
cent of the total area of the continent. In 1928
Empire Forestry Conference was told that the area
the Dominion's forest lands was 19,500,000 acr
Mr. Lane-Poole comments as follows:

> The rapid diminution of our forest area is not d
> to the exploitation of the forests by sawmillers or th
> alienation to settlers, but is due entirely to the improv
> knowledge of our forest resources. * * * For
> very long time the people lived in a fool's paradise a
> considered that their timber resources were inexhau
> ible, and the returns sent to the statistician were
> tinged with the optimistic idea that in this vast co

nt of ours there must be immense areas of forests.
re are actually immense areas of scattered open
k-like woodlands, but these are not commercial
sts. They have certainly helped the pioneer settlers
nake fences and in smaller measures they have
ided sleepers for railways, but they are not forests
he proper sense of the term. Of real forests ca-
le of yielding timber in quantities of at least 50
c feet per acre per year the area is very small, and
t most people fail to realize is that it was very small
n Captain Cook first landed on our shores. In
tern Australia, New South Wales, South Australia,
Tasmania the area is known, but in Victoria and
ensland classification of forest lands is not finished
* * * That is why we may anticipate a
her reduction of around 7,000,000 acres, from
00,000 to 12,500,000, or down to around three-
ths of 1 per cent of the total area of the
nmonwealth when we know the worst.
his is a very small area indeed and compares most
vorably with other lands. * * * European
ons claim that at least one-fourth of the total area
country should be devoted to the production of
ber. But European countries have for the most
a forestry climate throughout their areas and
out the heath and bog lands are capable of main-
ing a more or less dense population. It is not so
n us. The area capable of carrying a dense popu-
on is comparatively speaking small. There is a
area inland that can not carry a population and
not carry forests. Actually the area in Australia
is capable of carrying dense forests and a dense
ulation is within the narrow coastal fringe from
th to the Queensland Tropics which receives a
fall of 25 and over inches. The rest must remain
nd of sparse population and of small forest inter-
* * * Apart from a little area of hoop and
ri pines in Queensland and an insignificant supply
oftwood derived from Cypress pine in the western
of Queensland and New South Wales and the
ost vanished forests of Huon celery top and King
liam pine in Tasmania, we possess no areas of
ds that can be called soft. Real pines, spruces,
firs do not exist in our climate. While our hard-
ds are immeasurably better for all purposes than
softwoods of commerce, we can not afford to pay
hardwood and put it to entirely derogatory uses.
s it is that over £5,000,000 in cash has to be sent
of Australia to pay for the softwood of the com-
kitchen type that we require. That is not all,
some £6,000,000 worth has to be imported in the
be of paper or pulp.
* * Apart from alienated real forest land
ch will come back to the forest estate, there are
ls which, while not carrying native forests of
nmercial value, will carry forests of exotics. We
t a softwood that will grow on our second-class
dlands. * * * In the highlands of New South
es and Victoria we possess country which has a
ate which very closely approximates to the more
hern coniferous belt of America and the higher
ls of the Mediterranean region. Here then is an
ortunity of increasing our forest estate by the
oduction and planting of exotic pines. Again in
assured rainfall of the southeast coast of South
tralia and of Victoria we have coastal sandy lands
ch have given but a poor return for agriculture,
which will yield good crops of pine timber. Again,
similar land on the east coast pines of the South-
ern States of America will thrive.

Economic History of a German City Forest

By Bernard Frank, United States Forest Service

The city of Villingen, in South Baden, Germany, has a 9,200-acre forest from which it derives a net annual income of $10.73 per acre. This income is only 75 or 80 per cent of the annual net proceeds of the forest, the difference representing the value of free wood distributed to citizens and cash paid to citizens in lieu of wood. The operating ratio is about 54 per cent. Taxes compose 8 per cent of the total expense, as against 2 per cent before the war. An analysis by Forest Supervisor Gayer of the management of the forest, based on accounts covering a period of 90 years, appears in the January-February-March, 1930, number of Allgemeine Forst- und Jagd Zeitung.

Conditions on this municipal forest are typical of the Black Forest highland. Climatic conditions and other site factors favor the development of raw humus, and drainage is poor. Spruce, pine, and fir compose practically the entire stand. A small quantity of beech is present, which is to be increased, and larch is to be introduced as a means of increasing soil productivity. The management plan was first made in 1837 and has been revised every 10 years since except in 1917. Clear cutting was superseded by the selection system in 1880. As a result of early clear cutting the forest consists mainly of even-aged stands. The oldest age class occupies 24 per cent of the area, in contrast to a normal 7 per cent. This is balanced by a deficiency in the 61-80 year age class; the 1–60 year classes are normal. Cutting will, for a time, be concentrated on the surplus growing stock over 100 years of age and the normally stocked 81–100 year old stands.

A recent stem tally covered 88 per cent of the growing stock. This inventory, including computation, cost 67 cents per acre of measured area, or 0.7 cent per 100 cubic feet of timber.

From 1907 to 1927 utilization is reported to have averaged 922,000 cubic feet a year. This corresponds roughly with the average increment for the period. The average stand per acre increased steadily from 3,725 cubic feet in 1837 to 5,100 cubic feet in 1927. The total growing stock is now 47,450,000 cubic feet. About 24 per cent of the growing stock, or slightly more than the growth, is to be removed in the decade 1927–1936. The excess consists in improvement cuttings.

The annual cut has risen from 666,000 cubic feet in the decade beginning with 1837 to 1,065,000 cubic feet in 1927. The records show a great increase in the ratio of saw logs to fuel wood. Fuel wood distributed free to citizens made up 50 per cent of the 1870 cut but only 10 per cent of that of 1927. The steady rise in income per cubic meter previous to the war, which was paralleled by a rise in lumber prices, contrasts sharply with postwar fluctuations. The 1927 price was only 1.56 times the 1907–1913 average price, which indicates that the increase in the price of wood has not kept pace with the general rise in prices.

Logging costs increased by 79 per cent between the period 1907–1913 and the year 1927. They now compose from 15 to 18 per cent of the gross income. In 1927 the logging cost per 100 cubic feet was $2.24 for the main crop and $5.95 for the intermediate cut. The difference is due largely to the fact that the main crop was cut on a contract basis and the intermediate crop on a day-labor basis. Extension of the logging-road system has prevented logging costs from rising more than wages since the war.

Net returns per 100 cubic feet rose from $5.25 in 1877–1886 to $12.10 in 1926 and $15.15 in 1927. In 1926 by-products yielded 13 cents per acre, most of which was brought in by the sale of hunting licenses.

Cultural costs have been high because large areas have had to be planted. Additional expense was incurred for drainage as far back as 1837. The cost for planting, at the rate of 1,550 trees per acre, including soil preparation and plant production, is $27 per acre. The production of 4 and 5 year spruce transplants costs $3 or $4 per 1,000.

The revised management plan effective April 1, 1927, provides for improved methods of bookkeeping which will show the relation between utilization, rent, and capital, the changes in the value of the growing stock, the division of outgo into expense and investment, and the return on the investment, and will furnish the data necessary to develop the growing stock to its full earning capacity.

Ontario's New Forest Fire Act

Under Ontario's new forest fire law, enacted this year, the municipal corporation of any organized township is responsible for extinguishing forest fires in the township and for meeting the expense of extinguishing them. If a fire occurs that can not be controlled by means at the corporation's disposal, assistance may be requested from the provincial department of lands and forests. If the department furnishes assistance, half the expense so incurred by the department is payable by the township.

Provision is made for restricting travel on forest areas during periods of special fire danger. Permits are required for logging and other woods operations and for operating lumber mills within one-fourth mile of forest or brush land. Logging or other industrial permittees may be required to maintain fire-fighting equipment at specified locations and are required to bear the full cost of extinguishing any fires caused by their summer operations.

Violation of the law is made punishable by a fine of from $25 to $300 or, in default of payment of the fine, by imprisonment for not more than 90 days.

Fires on Prussian State Forests in 19

Official fire statistics for the State forests of Pru for the year 1928 give the total number of fires as 8 The fires burned over an average of 9.25 acres each 8,144 acres in all. The proportion of State forest a burned over during the year was 0.134 per cent. Sta entirely or mostly killed by fire included 66 acres oak and beech, 3,910 acres of pine, and 443 acres spruce. On 952 acres the timber was injured but so badly that it had to be cut, and on 2,773 acres ground cover only was burned. March was the w fire month, with 40 per cent of all fires. The remain fires were distributed chiefly as follows: April, 15 cent; May, 14 per cent; July, 11 per cent; Septeml 7 per cent; and June, 6 per cent. The only mon without fires were January and December. Cause fires were reported as follows: Carelessness (camp smokers, brush-burning, lumbering, etc.), 52.9 per ce railroads and motors, 8.1 per cent; incendiaries, per cent; lightning, 0.4 per cent; and unknown, 3 per cent.

Growth of Douglas Fir in Switzerla

In certain conditions of soil and exposure Doug fir is capable of an average growth of more than 20 cu meters per hectare per year in Switzerland, Prof. Badoux has found through studying the growth of species on a number of plots established by the Sw Federal forest experiment station. At 45 years it capable of growing 40 cubic meters per hectare i year. Lowland white fir (*Abies grandis*) has produ nearly the same volume in Switzerland, but is fo undesirable for culture there because its wood is infe in quality to that of the native fir and because the s imported from the United States has not germina well.

An Adaptable Spruce

An incident illustrating the vitality of the spruce related within the past few years by Seniore M Michelangeli, in charge of the State forests of Taravi Italy. The trunk of a spruce tree was covered t height of more than a meter with alluvial soil, wh upon the tree, to escape death due to the smothe of its roots, threw out adventitious roots near surface of the alluvial deposit. Flood waters sul quently carried away the alluvial soil, denuding adventitious roots. Thereupon the original set roots, having not yet ceased to function to s degree, resumed their full duty, with the result that tree continued to flourish. In quoting this story Bulletin de la Société Centrale Forestiére de Belgi points out that the case was an exceptional one, that to deposit soil removed in clearing roadways, e at the base of trees is an undesirable practice o resulting in the slow death of the trees.

rests and Forest Products of Estonia

orests cover about 21 per cent of the 18,354 square es of land south of the Gulf of Finland that now stitutes the Republic of Estonia, United States sul Harry E. Carlson reported in 1929. Of the l forested area of 945,883 hectares the Government s 79.8 per cent and farmers own 15.6 per cent. remaining 4.6 per cent is the property of industrial cerns and cities. The Government forests are aged by the bureau of forests in the department of culture. Some of the timber designated for cutting lled, and a portion of this is sawed into lumber, by State forest industry, a Government institution ned in 1926. Other Government timber to be cut old on the stump at public auction. During the ar period 1922–1927 the annual timber output of the onian State forests averaged 3,586,000 cubic meters.

n the year 1927–28 the total outlay of the State stry bureau was $570,060 and total receipts from Government forests were $1,925,350. In that year bureau expended $64,480 on reforestation and other st cultivation work, areas planted and otherwise rested totaling 6,313 hectares.

n the 5-year period 1923–1927 the value of Estonia's orts of forest products ranged from $3,110,470 to 33,100 a year. More than 90 per cent of the ublic's lumber exports are sent to England and land. Lumber exports to England in 1927 were ued at $2,071,830.

ising Pinus Merkusii on the East Coast of Sumatra

n the east coast of Sumatra the Pinus merkusii, ough it is a strong plant when the root has taken l hold of the soil, requires careful protection until seedlings are several weeks old. The seed are aced by doves and mice, the young plants by es, insects, and damping off. According to the ting practice approved by W. S. Gonggryp, chief ster of the east coast of Sumatra, the seed of this ies, valued in the East Indies for naval-stores pro- tion, are sown not in nursery beds but in germina- trays. The trays used are about 15 centimeters and of such size that they can be lifted by two . It is recommended that the trays be filled with sand or with a sand and loose earth mixture of ch sand composes 50 to 75 per cent. To disinfect earth as a method of preventing damping off the filled with earth is placed on a zinc plate on stone ports over a fire which applies heat to the whole er surface of the plate. In order that the earth he tray may not become too hot it is kept wet ing the heating process by pouring boiling water it. Heating at the boiling point for 15 minutes ufficient to disinfect the earth.

The nursery trays are deposited on frames the legs of which have been placed in bamboos filled with water to keep ants away. The seed are laid out in the trays in furrows about one-half centimeter deep which are then filled with fine sand.

Because shading furthers damping off the trays are not covered except during heavy showers, when movable "atap" roofs are used. When moles or locusts are feared the nursery trays are covered with mosquito netting during the night. Covers of fine gauze may be used as a protection against ants or doves.

The pine seedlings come above the surface of the soil in about two weeks. As soon as the skin of the seed has been dropped, that is, in about six weeks or two months, they are transplanted into nursery beds in which the soil has been loosened to a depth of 30 centimeters and thoroughly drained. Beds in which damping off occurs shortly after transplanting are disinfected by pouring over the affected spots a solution of 1 part of trade formalin to from 150 to 200 parts of water and covering the spots for one day with mats or gunny sacks. The disinfected earth is exposed to the air for at least a week before it is replanted.

The young pines are transplanted to the cultivation areas when they are from 6 months to 1 year old.

Forest Protective Associations of Quebec Report Few Fires in 1929

Forest-protective associations of lumbermen operating on public lands in Quebec reported only 191 forest fires on the 77,680 square miles of land which they patrolled in 1929. Areas stocked with mature timber that were burned over by these fires totaled 184 acres. The associations give a good share of the credit for this record to rainy weather. They are unanimous in praising the regulation which requires that persons wishing to travel through Quebec forests obtain permits. Another safeguard mentioned is the prohibition of smoking by men employed in lumber operations.

Careless campers head the list of forest fire causes, being held responsible for 23 per cent of all the fires. Lightning is second, with 20 per cent. Land-clearing fires, formerly a leading cause of forest fires in Quebec, accounted for only 2 per cent of the 1929 total.

Nearly all the forest area under license in Quebec is patrolled by the following protective associations: St. Maurice, Lower Ottawa, Laurentian, Ottawa River, Southern St. Lawrence, and Price Bros. All the associations cooperate with the provincial fire protection service. The associations employ, in all, 2,216 persons. They maintain 390 lookout towers and 8,768 miles of telephone line, and have cut or cleared 2,273 miles of portage or trail and rebuilt 593 miles of road. The Price Bros. now employ aircraft in patrolling 1,000,000 acres of land.

Mexican Dust Storms Charged to Deforestation

El Universal and other Mexican newspapers annually renew a campaign for reforestation when February and March bring the season of dust storms to the Mexican Capital, says a dispatch from Mexico City. Great forests that once throve about the city have been cut for fuel and lumber, and to this fact the press attributes the dust storms that sometimes descend on the city with the density of fog. At the time of the Spanish conquest Mexico City occupied an island in a vast shallow lake called Texcoco. Modern drainage has reduced Texcoco to one-tenth of its former size, much of the old lake bed is now dry, and when the unbroken winds swirl in the bowl-like valley the dust rises in clouds that obscure vision for miles.

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The University of New Brunswick has received a gift of $10,000 from the International Paper Co. to be used in equipping its new forestry building. This follows a gift of $5,000 made to the university by Price Brothers & Co. for the use of the forest school.

Western Australia's Giant Gum Tree

The karri tree (*Eucalyptus diversicolor*) of Weste Australia has been known to attain a height of abo 278 feet. It averages about 200 feet in height and characterized by a long, cylindrical, clear bole. O case is recorded in which 20,000 cubic feet of m chantable timber was removed from an acre of ka forest; in one operation covering 2,650 acres of ka forest the average volume of merchantable tim removed per acre was 3,600 cubic feet. Karri sho rapid growth, and regenerates freely from seed; b because its habitat is within the agricultural area the State, and because of the nondurable nature its wood, much of the land formerly occupied by fore of this species has been diverted to purposes ot than the growing of karri timber. The total stand karri in Western Australia was officially estimated 1928 at 301,650,000 cubic feet.

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A Royal Norwegian decree of March 21, 19 prohibits importation into Norway of any species elm.

Personals

Hugh Potter Baker has been elected dean of the New York State College of Forestry, succeeding the late Franklin F. Moon. Doctor Baker was the first dean of the college, serving from 1912 until 1920, when he became executive secretary of the American Paper and Pulp Association. Since 1928 he has been connected with the United States Chamber of Commerce. Doctor Baker is a graduate of the Yale School of Forestry and holds the degree of doctor of economics from the University of Munich. His earlier experience included 10 years with the United States Forest Service and several years of forestry teaching in the State Colleges of Iowa and Pennsylvania.

H. Basil Wales, assistant in forest management in the Albuquerque, N. Mex., regional office of the United States Forest Service, has been transferred to Milwaukee, Wis., as assistant regional forester in the Lake States region, succeeding W. F. Ramsdell. Mr. Wales's 20 years' experience as a member of the Forest Service has all been in the Southwest. He is not a stranger to the Lake States, however, having had his home in Michigan and received his forestry training at the Michigan Agricultural College.

James O. Hazard has accepted appointment as State forester of Tennessee. R. S. Maddox, Mr. Hazard's predecessor in that position, succeeds him as assistant State forester of Virginia.

Emanuel Fritz, associate professor of forestry at t University of California, has been made editor of t Journal of Forestry, succeeding Samuel T. Dana. P fessor Fritz has been a member of the editorial board the journal since March, 1922, and has written ma articles in his chosen field of forest products and wo utilization. He holds the degree of mechanical en neer from Cornell University and that of master forestry from Yale University, and has been a mem of the forestry faculty of the University of Califor since 1919.

Peter Keplinger has been transferred from the Den office of the United States Forest Service to the Wa ington office and given charge of personnel-train activities throughout the service. For more than years Mr. Keplinger has been studying the train needs of the Forest Service and working out meth for meeting these needs. The work contempla covers training in all kinds of national-forest work.

Will C. Barnes, formerly chief of the branch range management, United States Forest Service, retired as secretary of the United States Geograp Board. After 23 years in the Government serv Mr. Barnes turns from official duties to travel literary work. His immediate plans include exten research in State records of Arizona in preparation writing a history of that State.

olland Coleman, of the Denver regional office of United States Forest Service, has been made onal engineer of the service in the Lake States on. He will have general supervision of engineering k on the national forests in the Lake States, in-ing the development and maintenance of roads, s, and portages. Mr. Coleman entered the Forest ice in 1914, and since 1922 has been engaged in onal forest road construction work in the Rocky ntain region.

. W. R. Jackson has been appointed assistant hologist in the Office of Forest Pathology, Bureau of t Industry, and assigned to the Allegheny Forest eriment Station, Philadelphia, Pa. He will work cipally on butt rot of sprout hardwoods and on ases of forest nursery stock with particular em-sis on the relation between soil acidity and root gi. Mr. Jackson is a forestry graduate of the versity of Minnesota and has had three years of luate work in botany at the Universities of Minne- , and Pennsylvania. He was formerly connected the Office of Forest Pathology for two years.

. M. Gromov, president of the union of lumber, er, and wood products industries of the Union of alist Soviet Republics, recently came to the United es to make a study of American woodworking and milling machinery, accompanied by I. A. Mur-ov, E. P. Trutnev, and K. I. Pushkin, chief engineers furniture factory group, a group of plywood and eer plants, and a sawmill group, respectively.

arl M. Müller, forest assessor and assistant at the st experiment station at Munich, Germany, is in erica making a special study of the Abies. The erican species, particularly A. nobilis and to a lesser ree A. grandis, apparently are less subject to ct injury and disease in south Germany than the ive species A. pectinata. Doctor Müller is the hor of several books on forest trees, and a few rs ago explored the Balkan Peninsula in connection h a study of Pinus peuce, the white pine that arently is not susceptible to the blister rust. He be in America about six months, spending his e principally in the Pacific Northwest and British umbia.

Robert Marshall, of the Northern Rocky Mountain est Experiment Station, has received the Ph. D. ree from Johns Hopkins University. Mr. Marshall obtained leave of absence for 1930 and 1931 and is ng to Wiseman, Alaska, where he will make a iological study and will continue his studies of tree wth at the northerly limits of its existence.

The present membership of the National Research ncil's forestry committee is Raphael Zon (chair-n), Earle H. Clapp, H. C. Cowles, S. T. Dana, T. Fisher, W. R. Hine, B. P. Kirkland, Aldo Leo-d, David T. Mason, and E. N. Munns.

R. Grady Rankin, Gastonia, N. C., has been appointed a member of the North Carolina Board of Conservation and Development to succeed Ben B. Gossett.

J. Alfred Hall has accepted appointment to the staff of the Forest Products Laboratory, to engage in naval stores studies. He will take charge of the chemical phases of the studies in which Eloise Gerry is conducting the work on physiology and microscopic structure. Mr. Hall, who is a graduate of the University of Wisconsin, has had eight years' experience in research on plant products and volatile oils. Since 1928 he has been chief chemist of the chemical laboratory established at Duke University under the Liggett & Myers research fellowships.

R. R. Fenska, of the faculty of the New York State College of Forestry, visited Europe this summer, his itinerary including forests and forest schools in France, Germany, Switzerland, Austria, and Czechoslovakia.

R. P. Holdsworth has resigned as professor of forestry in the University of Arkansas and during the coming school year will teach forestry in the Massachusetts Agricultural College.

Floyd E. Carlson has accepted a position in the extension department of the New York State College of Forestry, succeeding J. D. Kennedy. Mr. Carlson received the B. S. and M. F. degrees from the University of Washington in 1928 and 1930, respectively. He has had reconnaissance experience in Alaska and has represented the State of Washington in a forestry educational campaign.

Arthur Koehler, in charge of silvicultural relations, Forest Products Laboratory, has accepted the position on the editorial staff of the Journal of Forestry that was formerly occupied by Emanuel Fritz, now editor in chief of the Journal. The subjects assigned to Mr. Koehler are forest utilization and wood technology.

Annie E. Hoyle has retired as artist, United States Forest Service, after five extensions of time beyond the usual age for retirement. In 23 years' connection with the service Mrs. Hoyle has made a valuable and lasting contribution to American dendrology and botany with her many expert line drawings illustrating characteristics of tree and plant species. The drawings appearing in the dendrological bulletins of the late George B. Sudworth are her work, as are those in several publications dealing with American forage plants. In recent years certain of her drawings have become widely familiar as illustrations for a popular series of State forest tree manuals. Mrs. Hoyle's preparation for her work included seven years' art study in Washington, New York, Paris, and London, and also studies in morphological and systematic botany.

A. C. Seward, of Cambridge University, was made president of the Fifth International Botanical Congress, which assembled at Cambridge on August 16. The chairmanships of three of the eight sections in which the active work of the sessions was carried on were given to Americans. These were H. C. Cowles, of the University of Chicago, who presided over the section on plant geography and ecology; R. E. Buchanan, of the Iowa State College, who had charge of the section on bacteriology; and L. R. Jones, of the University of Wisconsin, who headed the section on plant diseases and the fungi that cause them. American honorary vice presidents of the congress were L. H. Bailey, of Cornell University, R. A. Harper, of Columbia University, and E. D. Merrill, of the New York Botanical Garden.

E. G. Wiesehuegel is leaving the faculty of the Idaho School of Forestry to take charge of the work in forestry at Ohio State University, succeeding Norman W. Scherer.

R. E. McArdle, of the Pacific Northwest Forest Experiment Station, has received the Ph. D. degree from the University of Michigan, after three years' graduate study at that institution. He has been preparing especially for forest fire studies.

R. M. Nelson, forest pathologist of the Bureau of Plant Industry stationed at the Appalachian Forest Experiment Station, received the Ph. D. degree this year from the University of Minnesota.

Ferdinand W. Haasis, formerly assistant silviculturist at the Appalachian Forest Experiment Station, has resigned as associate professor of forestry at the University of Idaho and is now associated with D. T. MacDougal, of the Carnegie Institution of Washington, with headquarters at the Carnegie Coastal Laboratory, Carmel, Calif.

R. E. Balch, a graduate of the Ontario Agricultural College, who was for two years a graduate student in the New York State College of Forestry and was temporarily employed by the United States Bureau of Entomology at several periods, is now forest entomologist for New Brunswick, with headquarters at Fredericton.

P. S. King has been made assistant State forester of Oregon in charge of forest protection. Mr. King has been a field inspector in the Oregon Forestry Department since 1921.

Margaret C. Stoughton, a forestry graduate of the Iowa State College, has been appointed junior forester at the Appalachian Forest Experiment Station. Miss Stoughton is the first woman to be appointed to the United States Forest Service in that grade.

W. G. Wahlenberg is being reinstated at the South Forest Experiment Station, from which he resig early in 1929 to accept a position as forester at the Ed Tree Breeding Station, Placerville, Calif. He retu as associate silviculturist, and will engage in studies the management of second-growth pine.

James Lindsay Alexander, assistant professor forestry, University of Washington, shares with f other Americans and one Canadian the good f tune of being named by the Charles Lathrop Pa Forest Education Board in the board's first ann award of fellowships. He will make an investigat of forest survey methods, working at the University Toronto and the University of Washington and in forests of the eastern and western United Stat Ralph Caird, graduate student, University of Chica is awarded a fellowship for general forestry study the University of Michigan and advanced work in t physiology and pathology. Bernard Frank, assist forest economist in the Washington (D. C.) office the United States Forest Service, will work on la classification methods and land utilization techni especially as applied to forest lands, studying at University of Wisconsin and making field investigati in the Lake States. George Ritchie Lane, forester charge of reforestation, Canada Power & Paper C poration, Grand' Mere, Quebec, will investigate planting of pulpwood species and the growth and yi of such species in the Maritime Provinces of Cana Raymond Frank Taylor, technical assistant on Tongass National Forest, Alaska, will study silvicultural management of coniferous forests at Yale School of Forestry, supplementing this wo with field study in Washington and Alaska. Jo Burton Woods, forester of the Long-Bell Lumber at Longview, Wash., will study the practice of fores on private timberlands and write a book on the subj

F. T. Murphey, extension forester for Pennsylvan has been granted leave of absence for graduate stu during the nine months beginning with October, 19 William Ira Bull, a forestry graduate of the Pe sylvania State College, will substitute for him d ing that period.

Orrin L. Latham has resigned as forest ranger the Idaho National Forest to become an instructor the New York State Ranger School. Mr. Latham a forestry graduate of the Iowa State College.

Ralph G. Unger, a graduate of the New York St College of Forestry, has been made an associate f ester of St. Lawrence University, with headquarters Malone, N. Y. Mr. Unger's principal duty will be cooperate with officials of Franklin and Clinton Co ties, N. Y., in county forestry work. He will assist a individual or organization in the two counties in ref estation work.

Bibliography

sgen's Forest Botany Available in English

By E. N. Munns, United States Forest Service

nother outstanding European work in the field of stry has been made available to those reading no uage other than English, through publication [2] of nslation of The Structure and Life of Forest Trees, Moritz Büsgen, late professor in the Royal Prus- Forest Academy in Hannover-Münden. The slation is of the third edition, in which Büsgen's was revised and enlarged by E. Münch, professor he Forest Academy at Tharandt. The book is a of the first water, taking its place beside such nt European works as Dengler's Waldbau, Troup's culture, and Maximov's Growth. Thomas Thomp- lecturer in forestry, University College of North es, is the translator.

s a specimen of idiomatic English, it may be re- ked, the translation suffers by comparison with English version of an earlier edition of Büsgen's k prepared by Raphael Zon.

here is little doubt that the translation will be, as mpson hoped, "a useful addition to our forest- nical literature." Forest, or, as it may almost er be called, tree botany is now served up to the erican student forester by botanists who, however ble as botanists, and however interested in trees, lly know little of forestry principles or practices. st botanists consider the tree as a plant differing ificantly from other plants only in size. The ster considers the tree not only as a plant but also member of a society in which the individual func- s in relation to other individuals and to the whole st population. Büsgen's approach to the subject es his book one that can be heartily commended otanists who teach forest botany and to practicing sters. Indeed, the book could well be made a part he general reading of any forester, particularly of forester to whom information on recent advances lant physiology is not readily available.

he book closes with a chapter on the subject, ely neglected by foresters, of local races of trees the climatic and soil factors that have brought ut their occurrence. A consideration of what gen has to say on this subject should give pause to se who are basing reforestation programs on cheap l rather than on seed suitable for the planting site.

The translation is well indexed and is well illustrated. The volume would have been improved by the addition of a glossary for the benefit of the general reader. Another drawback is the lack of references to American literature, which includes a growing and important list of real contributions on the subject.

Yale Bulletin Tells How a Watershed Forest is Managed for Timber Production

By F. H. Eyre, United States Forest Service

In a publication entitled "The Eli Whitney Forest" [3] Ralph C. Hawley and William Maughan have described in easily understandable style the demonstration of forestry practice on the lands of the New Haven Water Co. The publication is exceptionally well illustrated. In fact the illustrations alone would make a worth-while publication. We sometimes hear of busy people who will not read bulletins even if the bulletins are given to them, but almost every one will look at the illustrations of any bulletin that falls into his hands. Anyone who will take time to scan the 56 large plates in this publication and read their legends can learn much about applied forestry. Even so, the illustrations would have been much more effective had there been more plates to show conditions before forestry treatment.

Under the direction of Eli Whitney, for many years its president, the New Haven Water Co. early adopted the plan of developing a productive forest on the lands which it was holding for watershed protection. In 1907 the company's entire holdings of more than 8,000 acres were placed under management with Prof. R. C. Hawley, of the Yale School of Forestry, as forester. In the past 20 years a regulated average annual cut of 320,000 feet board measure and 1,300 cords has been made. The cut has been most conservative, and the growing stock has been increased materially by judicious improvement cuttings. At present the growing stock [4] is estimated at nearly 26,000,000 board feet. The policy of undercutting the annual growth, now estimated at 3,720,000 feet board measure, will be continued until such time as the growing stock approximates 80,000,000 board feet, the ultimate aim. Since 1907 the company has gradually extended its holdings,

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y John Wiley & Sons (Inc.), New York, 1929.

[3] Yale School of Forestry Bulletin 27. 42 pp. New Haven, Conn., 1930.

[4] Excluding hardwoods with breast-height diameters of less than 8 inches and conifers with breast-height diameters of less than 5 inches.

so that it now owns more than 20,000 acres. Detailed descriptions are given of each of the various forest types and of the silvicultural treatment that has been adopted for each type on the basis of experience. The commercial development and operation of the tract is shown to be entirely consistent with its functioning as a protection forest.

It is to be regretted that some standard terminology was not used throughout in giving the common names of trees. Liriodendron tulipifera, for example, is frequently termed "whitewood."

This publication is intended to present an object lesson in applied forestry. The price, $1.50 a copy, would seem likely to limit its distribution. It may well be that a cheaper bulletin would have served more effectively the purpose the authors had in mind. Nevertheless, a publication presenting such an admirable example of forest management should serve to interest many owners of forest property. It would seem that many city or county owned tracts could be handled in a manner similar to that described. In New York State alone, according to another author, 26 cities own or control 220,000 acres of watershed. Many watershed areas owned by municipalities, unquestionably, are in as good condition as were those of the New Haven Water Co. in 1907. What better treatment could be given them than to put them under management comparable to that of the Eli Whitney Forest?

Knotty Lumber Found Serviceable for Boxes

Boxes made of knotty lumber, if properly designed, will give as good service in shipping as boxes made of selected clear lumber; in some cases, in fact, a better and more serviceable box results from using the knotty material. This was brought out in tests conducted by G. E. Heck and I. B. Lanphier, engineers at the Forest Products Laboratory, Madison, Wis.

In thin box lumber the diameter of no knot should exceed one-fourth the width of the board; in thicker material a knot occupying one-half the width of the board is permissible. The position of the knot makes little difference so long as it does not occur at the nailing edge.

In one group of boxes with short, relatively thick sides included in the tests the boxes in which knotty lumber was used withstood half again as much knocking about as those built of all-clear material.

"The effective use of wood for shipping containers has a broad and realistic bearing upon public interests," said Carlile P. Winslow, director of the Forest Products Laboratory, in announcing the results of the tests. "Shipping containers constitute one of the principal outlets for the large proportion of low-grade lumber that necessarily develops incident to the manufacture of higher grades. The utilization of this low-grade lumber is one of the key problems in the practice forestry. Unless the lower grades can be made stand some share of the costs of timber producti the growing of timber can hardly be made to pay way. As this type of material can be segregated a used according to its special properties, larger amou will be absorbed in industry and its economic va will become stabilized and strengthened. While it true that the indiscriminate use of knotty stock m produce inferior boxes, these tests clearly show th the elimination of all knots is unnecessary."

The results of the laboratory's tests and suggestio for applying them are given in United States Depa ment of Agriculture Circular No. 105, Knotty Lum for Boxes. Copies of the circular may be obtained f of charge from the United States Department of Ag culture, Washington, D. C., as long as the present s ply lasts.

American Museum Curator Describ Araucaria Forests of Chile

"Camping in a Prehistoric Forest" is the title of article in the July-August number of Natural Hist by H. E. Anthony, curator, mammals of the wor American Museum of Natural History, telling of exp iences in the Araucaria forests of Chile. A gene description of the "prehistoric" genus is given follows:

> The Araucaria is a coniferous tree, called a pine South Americans but only distantly related to the t pines. The tree, which took its name from the distr of Arauco, Chile, is one of the few relicts of a type forest formerly distributed throughout the wo Only about a dozen species exist to-day, which are c fined to very restricted areas in Chile, Brazil, Austra and a few of the Pacific islands to New Guinea. T fossil records show that forests of the Araucaria t probably existed in Palæozoic times and were wid distributed and comparatively abundant during Mesozoic era. During the Jurassic, these trees flo ished in what is now Great Britain, France, India, a southern Africa, among other localities. In the C taceous, they were growing in the Western Hemisph from New Jersey and the Dakotas to Patagonia. * The tall, straight trunk of the Araucaria makes splen lumber and this tree is the most valuable timber Chile. Because of the scarcity of large limbs, Araucaria gives a very high yield per tree of mercha able timber.

Describing the tree as seen in his recent travels a member of the Ottley-Anthony South American Ex dition, Mr. Anthony writes:

> The Chilean Araucaria (*Araucaria imbricata*) lo like something out of the past, at least to northern e At a distance the fully grown trees appear to be la palms, with all the limbs confined to a crown carr on a straight columnar trunk. This is the spe known to the nurseryman and florist as the monk puzzle. Before visiting Chile I had supposed that feature which puzzled the monkey was the close rangement of the limbs, a not particularly disturb tangle for an active animal like the monkey. Inqu

ne region where the trees grow provided another anation. The monkey is puzzled because of the spiny character of the foliage, which tips upward. monkey might climb the tree without pricking it- but would be in a quandary when descending nst such an array of points. This foliage is stiff gh to pierce clothing and draw blood if one care- y brushes against it.

ne Araucaria forest in Chile is restricted to a small in the Nahuelbuta range (a coast range), about outh latitude, and a rather larger stand in the main illera of the Andes between 37° 30′ and 40° south, e it occurs in a narrow strip little more than 100 neters wide and between the altitudes of 600 and) meters above sea level. The expedition camped collected mammals in both forests.

* * Our tent was pitched in a small grove of ucaria atop a low hill. There was considerable arity to a pine forest in the vista of clean, rough- ed trunks, in the litter of needles underfoot, and ne noise of the wind through the tree tops. But e was a vicious note to the soughing of the wind, a ng quality to the rush of the air through the keen ge overhead, that seemed more in keeping with the ed character of the trees themselves. The Arau- s did not give pliantly to the breeze, like pines; stiff foliage cut the wind and let it whistle past, one might imagine that to these survivors of more uous epochs a little wind was nothing—in the ggle for existence the species has seen millions of s of winds.

ne forest of the Nahuelbutas is not a pure stand of ucaria. There is a large admixture of deciduous , mostly varieties of the southern beech, Notho- s. These beeches are fine, large trees, with thick ge, and are often draped with long streamers of Spanish moss. * * * The Nahuelbutas are rrelless, although the seeds of the Araucaria would favorable food supply. These seeds are large, h larger than those of any of our pines, and are e for humans. The Araucanian Indians in the gathered them regularly when the cones ripened. trunks of the Araucaria are rather too large to o easily; one I measured near camp had a circum- ice of 12 feet 2 inches, at a height of 5 feet above ground.

series of excellent photographs by the Ottley- ony South American expedition illustrates the le.

v Bulletin Gives Results of Studies of Air Seasoning

ne sawmill owner with a stock of millions of feet of ber in his yard and the farmer with a few hundred n fence posts will each find useful wood-drying in a new Government bulletin, The Air Seasoning Vood. J. S. Mathewson, of the Forest Products oratory, is the author.

ne new bulletin is based on the results of research ucted by the Forest Service at the Forest Products oratory, Madison, Wis., and elsewhere. It outlines principles of wood drying and shows how they y to the air seasoning of boards and planks, ension stock, lath, crossties, poles, posts, timbers, wood, cooperage, and veneer. It discusses the variations observed to occur in rate of drying and in final moisture content according to climate, time of year, kind of wood, thickness of stock, locality of growth, yard location and arrangement, and piling method.

While the supply lasts Technical Bulletin No. 174, The Air Seasoning of Wood, can be obtained free from the Department of Agriculture, Washington, D. C.

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Miscellaneous Publication 82–M, How the Natio Forests of California Benefit the State.

Folder, Think it Over: Fire is an Outlaw in the Wo

National Forest Administrative Maps, ¼-inch: Tet Carson, Crater, Malheur, and Rainier.

U. S. GOVERNMENT PRINTING OFFICE:

FOREST WORKER

November, 1930

Issued bimonthly by the FOREST SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

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Announcements

South Carolina Commercial Forestry Conference

A South Carolina commercial forestry conference is to be held during January, 1931, according to a decision arrived at by a group representing manufacturers, lumbermen, educators, landowners, farmers, foresters, and chambers of commerce of the State. L. I. Guion, of Lugoff, S. C., is chairman of an executive committee which will select a general committee and make plans for the meeting.

Meeting of Society of American Foresters

The matured program for the 1930 annual meeting of the Society of American Foresters, to be held in Washington, D. C., December 29–31, includes as speakers Arthur M. Hyde, Secretary of Agriculture; Ray Lyman Wilbur, Secretary of the Interior; R. Y. Stuart, Chief of the Forest Service; John C. Merriam, president of the Carnegie Institution of Washington; Paul G. Redington, chief of the Bureau of Biological Survey and president of the society; Elwood Wilson, of the Canadian Society of Forest Engineers; and W. E. Hiley, of Oxford University. In addition to discussion of the land policy of the United States, examples of successful private forestry practice, and the expansion
of the field of forestry, the program is planned to
out much information on specific technical for
problems. The Champion reforesting machine w
demonstrated.

At the thirtieth-birthday banquet of the so
Gifford Pinchot will act as toastmaster and Ra
Zon will review the society's accomplishments.

Inquiries in regard to arrangements for the me
should be addressed to W. R. Hine, Hill Buil
Seventeenth and I Streets, NW., Washington, D.

Ohio State University Needs Fore
Publications

E. G. Wiesehuegel, professor of forestry at the
State University, finds himself in need of li
material not now available for use in connection
his teaching, and will be glad to hear from organizat
institutions, and individuals wishing to cooperate
the university by providing copies of forestry pu
tions. Professor Wiesehuegel may be addresse
care of the Department of Horticulture and Fore
Ohio State University, Columbus, Ohio.

* * *

NOTE.—For announcements regarding forestr
lowships, see page 7.

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single copy or 25 cents for a year's subscription to the Superintendent of Documents, Governme
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FOREST WORKER

shington, D. C. NOVEMBER, 1930 Vol. 6, No. 6

State Forestry

ght Growth of Private Forest Plantations in Pennsylvania

strict Forester E. F. Brouse, of the Valley Forge ct of Pennsylvania, warns fellow foresters to con- carefully their responses to the prospective plan- query "How fast will the trees grow?" The t-growth figures that fasten themselves in one's , he points out, are those for the most successful ations; besides, the basis of height-growth data is ly the plantation on public land rather than the te plantation, which as a rule has less skillful and consequently makes poorer growth. As some ation of the growth that may be expected of private t plantations in Pennsylvania Mr. Brouse presents on the growth of a number of such plantations counties in all parts of that State. Determination ight growth was not the primary purpose of the in which these figures were collected, which ex- s a wide variation in the number of measurements for individual species. The fact that the planta- were chosen without discrimination enhances the ability that the figures for northern white pine, h pine, and Norway spruce are close to being true ges. For the other species listed the figures repre- too few plantations to carry much weight. For of the plantations the average height growth was rmined by measuring a representative number of , usually from 50 to 150, to tenths of a foot. The es are as follows:

Species	Average height of trees, by age			Number of plantations measured	Number of trees in plantations	Percentage of plantations in open areas
	5 years	10 years	15 years			
thern white	*Feet*	*Feet*	*Feet*			
ne	2. 0	5. 5	10. 5	201	749, 800	83. 1
ch pine	3. 0	7. 8	14. 0	58	161, 400	81. 0
n pine	3. 4	8. 2	13. 2	25	119, 000	88. 0
vay pine	2. 5	7. 5	-----	27	115, 900	58. 9
vay spruce	1. 6	4. 5	----	98	366, 100	81. 6
nese larch	2. 4	6. 9	-----	38	101, 900	71. 0

The fact that at the age of 10 years pitch pine showed a greater average height growth than any of the other species listed is partly explained by the fact that only 12 per cent of the trees of this species were underplanted. Of the Norway pines 40 per cent were planted among and under other trees, yet this tree outgrew the Scotch pine and the Japanese larch. Norway spruce bore out the common impression that it is slow in starting. A disappointment for Mr. Brouse was the slow growth of the northern white pine. Numbers of plantations of northern white pine in Pennsylvania to his knowledge have averaged from 15 to 20 feet in height at 10 to 12 years, and several have reached a height of 64 feet in 22 years. A possible explanation of the record made by the northern white pine is offered by the fact that this tree is cursed with numerous enemies and that it is more exacting in soil requirements than most of the others listed. One of the best Scotch pine plantations examined showed an average height of 38 feet at 16 years of age.

In point of survival the plantations represented by these data were only 43 per cent successful. Their failure to show a higher percentage of survival and more rapid growth is attributed by Mr. Brouse to improper selection of species, careless handling and planting, underplanting, pasturing, insects, fungi, and "all other abuses it is possible to heap upon them."

New Forest Fire Laws of Virginia

Virginia forest wardens are authorized by a law of 1930 to summon any able-bodied male between the ages of 18 and 50 to assist in extinguishing any forest fire in a county organized for forest fire control under State direction. Persons so summoned will be paid for their services at the rate provided for in the State forest service wage scale. Refusal to respond to a warden's summons without a valid reason is a misdemeanor punishable by a fine of from $10 to $25.

Under another law recently enacted in Virginia, to build or use a fire in the open air and leave it unextinguished and untended is a misdemeanor punishable by a fine of from $10 to $100. The offender is held liable for the full amount of all costs incurred in extinguishing the fire.

Fuel from State Forests Free to Connecticut's Unemployed

Fuel is one thing for lack of which Connecticut's unemployed need not suffer this winter, says State Forester Austin F. Hawes in a letter which he has circulated to the mayors of a number of cities. In Mr. Hawes's opinion the wood now going to waste on Connecticut State forests amounts to 50,000 cords, and as much more could be cut with results beneficial to growing conditions on the forests. Wood that is going to waste or that could be removed with benefit to the forests will be given free to any who will cut and remove it. A large quantity of dead wood is available, which can be burned at once, and green wood cut early in the season will be ready for burning before the end of the winter. This will consist largely of gray birch, red maple, and defective oak and other hardwoods.

Written permits will be issued to individuals or organizations to cut and remove wood under the supervision of forest rangers. All live trees to be cut will be marked by rangers. Individual permits will be limited to 10 cords. Charitable organizations, employers, or community groups may obtain permits for cutting and removing considerable quantities of wood to be distributed without profit.

Mr. Hawes points out that several Connecticut cities, as well as smaller communities, are within easy hauling distance of the State forests. The Mattatuck Forest is within 4 miles of Waterbury and Thomaston, and the Peoples Forest is within 6 miles of Winsted and New Hartford. Hartford, Torrington, Middletown, New London, and other cities are within 10 to 15 miles of State forests.

Indiana Develops State Forests

Indiana is progressing steadily in acquiring second-growth timberland and waste areas for State forests, reports State Forester Ralph F. Wilcox. A specific forestry levy of 2 mills brings in $100,000 each year for the operation of the State nursery and the purchase, supervision, and development of land for State forests.

The Clark County State Forest, Henryville, Ind., which when originally purchased in 1903 consisted of 2,000 acres, has been increased to 5,300 acres. Practically the whole area is well stocked with oak and hickory. A sawmill operated at the State forest each year cuts 2,000 or 3,000 crossties from over-mature and defective trees. During the past three years net logging profits for individual tracts have ranged from $16 to $32 per acre. The cuttings leave the stands in better silvicultural and earning condition than before. All costs and receipts are recorded separately for each tract. Selective cutting on these units will again be possible in about 10 or 15 years.

A new State forest of 9,000 acres has been purch in Morgan and Monroe Counties, near Martins within 35 miles of Indianapolis. About 90 per of the area is in forest cover, although practicall merchantable material has been removed and stands have been severely injured by forest fires du the past few years. A lookout tower has been ere and a system of organized protection for the new f and for surrounding woodlands in private owner has been put into effect. It is planned to enlarge forest to 25,000 acres.

The Indiana Department of Conservation adopted the plan of establishing a 5,000 or 6,000 State forest each year in the southern part of the St At least 500,000 acres of land in Indiana is consid by the Department to be suitable for State for The State forests are open for recreation and are to demonstrate methods of tree planting, protect and forest improvement.

The Elliott State Forest of Oregon

Oregon's first State forest has been named in mem of the late F. A. Elliott, for 19 years Oregon S forester. The Elliott State Forest, formerly know the Millicoma tract, comprises 70,000 acres of lying south of the Umpqua River between Scotts and Reedsport. To acquire it the State excha a number of isolated school sections within nati forest boundaries for one block of Government-ow land on the Siuslaw National Forest. The mov acquire the tract in this way was inaugurated by Elliott and Governor West in 1912.

A large part of the present State forest lay in path of the Coos Bay fire of 1868, but the burned- portion is described as having largely come back t excellent stand of second-growth Douglas fir approaching merchantable size. Scenic features the forest are the Millicoma River, Elk Lake in interior, and Loon Lake on the eastern boundary, the precipitous bluffs and mountains bordering Umpqua River throughout the length of the forest

* * *

The Massachusetts State forest act has been amen to permit inclusion of 150,000 acres of land in S forests. Previously the limit was set at 100,000 a

* * *

The Virginia Bureau of Parks has completed exa nation of more than one-third of the area proposed State purchase for inclusion in the Shenandoah tional Park. At the end of October about 120 acres out of a total area of 312,000 acres had b examined. The acquisition work is being directed S. H. Marsh, formerly of the United States Fo Service.

v Machine Eliminates Much Labor from Forest Planting

many as 2,500 trees can be planted in an hour by use of the duplex reforesting machine developed I. R. Walling of the Champion Sheet Metal Co. .), Cortland, N. Y., the New York Conservation artment reports. The machine is drawn by a or, and its operation requires two men in addition ne driver. A fourth man serves as relief operator replenishes the machine with trees. (Approxi- ely 6,000 3-year transplants can be carried on the hine.) By the use of the "simplex" type of the e machine, which is drawn by horses and is operated ne man in addition to the driver, it is possible to t 1,500 trees per hour. With a simplex machine department planted 75,000 trees on the Brookfield estation area last spring at a cost (including a $50 sportation charge) of $3.36 per 1,000 trees, which bout one-third as much as it would have cost to t the area by hand. With the duplex machine, estimated, large-scale plantings can be carried out cost of $2 per 1,000 trees. The department has ided itself with one simplex and two duplex hines.

he duplex machine cuts two furrows, 6 feet apart, means of a pair of shoe-shaped plows which are ched to the sides of a low platform. Before each v runs a steel coulter wheel which cuts the sod. he vertical shank attaching each plow to the plat- n is a wide slot extending to the sole of the plow. the front of the platform, before the seats for the nters, are several steel rings in which pails of trees set. Back of these are small, shallow troughs con- ing water, in which trees taken from the pails are ed in readiness for planting. As the machine ves over the ground a trailing wheel provided with ommutator rings a bell at intervals of 6 feet. At signal each planter passes a tree through the slot he plow next which he is seated, holding it until ssumes an upright position in the ground. Two nping wheels, the treads of which slant slightly in- rd, almost instantly pass on either side of the tree, these are at once followed by a large tamping or king wheel with divided tread. By taking care grasp each tree at the point where the stem emerged n the soil of the seed bed the planters can obtain desired planting depth.

he machine is supported on its hind wheels. In front wheels the axle is located at some distance n the center, so that the wheels simply drag until plow encounters an obstruction. The front wheels then so thrown as to lift the front end of the appa- ıs and bring the plows practically out of the und. As an additional safeguard against jamming rough ground, the coupling of the tractor is made h a spring so that when the strain goes beyond a certain point the machine is automatically released. These features and the strong construction of the machine are said by the makers to permit its successful use on extremely rough areas and areas having a heavy brush cover.

The machine is adapted to planting trees of various sizes, from 1-year seedlings to 4-year transplants.

In a September 12 report on its experience with this reforesting machine the New York Conservation Department stated that a recent check of the trees planted with the machine last spring indicated results comparing favorably with those usually obtained by hand planting.

Porto Rico Nurseries Increase Production

With no increase in nursery expenditures, the Porto Rico Division of Forestry produced about 40 per cent more forest planting stock in the year ending with June, 1930, than in any preceding year. The increase in production was effected mainly through a cut in the number of species produced. With about 35 of the species used in recent years eliminated, sowings in the nursery were principally of about 40 species known to do especially well in Porto Rico. This year the number of species grown may be further reduced.

At one time and another nearly 500 species of forest trees have been grown in the Porto Rico nurseries and sent out to various sections of the island for trial.

The total output of the insular nurseries for the fiscal year 1930 was 1,366,275 trees. Of this number 141,059 were planted on insular forests, 25,938 were distributed to schools for Arbor Day planting, about 48,000 were used for roadside planting, and the remainder were distributed to private individuals, free of charge, for planting on their own land. About 1 per cent of the total output were distributed for planting as ornamentals on private land, on the theory that to familiarize the public with the rapidity of tree growth in Porto Rico will stimulate public interest in forest planting.

In periods of exceptional drought during the past year several men were kept busy day and night watering the beds in the insular nurseries, with the result that no unusual losses occurred.

Twenty new concrete seed beds were constructed in the forestry division's principal nursery, at Rio Piedras, during March and April, increasing its average seedling capacity to 900,000 a year. This nursery contains 405 transplant beds, 4 by 25 feet, which have an annual capacity of about 200,000 trees.

For shading nursery beds in which very fine seed such as that of Eucalyptus and Casuarina have been sown, cloth has given much better results than lath in the Porto Rico nurseries, where lath shades are in general use. Water which collected on the sides of the lath, either during rainstorms or when the beds were watered artificially, washed a large percentage of these fine seed out of the soil. No such trouble was experienced when cloth shades were used.

This year the insular forester, W. P. Kramer, plans to make a study of the costs of producing forest trees of the individual species most important in Porto Rico.

New Hampshire to Distribute Root-Pruned Seedlings

The New Hampshire Forestry Department is introducing to the public of that State a type of planting stock not previously distributed from its nursery, 3-year root-pruned seedlings. Tests carried out by both the forestry department and the State university during a period of two years, under various conditions, have shown that 3-year root-pruned seedlings are no less desirable than 3-year transplants and on most sites are a satisfactory substitute for 4-year trees. The seedlings are grown in less dense stands than as if they were to be transplanted within the nursery. At the beginning of the third year's growth any surplus trees are weeded out and the roots are cut 4 or 5 inches below the surface of the soil. This prevents excessive development of lower roots and stimulates the growth of roots near the surface.

This type of planting stock costs about $2.50 per 1,000 less than 4-year transplants. It is offered by the department at $4.50 per 1,000 for northern white pine and at $5.50 per 1,000 for Norway pine, white spruce, and Norway spruce.

Fall-Planted Pines Thrive in East Texas

Fall and early winter seem to be as safe a time as spring for planting pines in east Texas, the State forest service reports on the basis of results obtained from a planting made last year. In the period December 4–14, 1929, the service planted more than 20 acres of the Newton County State Forest, near Kirbyville, with shortleaf, loblolly, longleaf, and slash pine. Practically all the stock had been grown at the State forest near Conroe. The trees experienced exceptionally unfavorable conditions: Sawdust was used in packing them for shipment; freezing weather began only 8 days after they were planted, and continued for 9 successive days, accompanied by a 5-inch snowfall; in January there were 10 days of even colder weather; and a drought that began May 24 continued past mid-August, with but 2 inches of rainfall during that period. On July 9, however, the plantation in which losses had been greatest showed a 52 per cent survival, and the best plantation showed a survival of 98 per cent.

Trees from shaded and unshaded nursery beds seemed to have had equal chance to survive. Plants from shaded beds showed slightly greater average heights. The most marked distinction between the trees g in shaded and those grown in unshaded beds sisted in the susceptibility of slash pine from sh beds to freezing. Slash pine from shaded beds sh about 5 per cent greater loss from this cause than pine from unshaded beds. Native species showed little loss from freezing. The greatest loss that c be attributed largely to winter freezing was 15 cent, occurring in a slash pine plantation. At the of the examination the heaviest loss from drought 15 per cent. This likewise occurred in a slash plantation.

Through earlier experiments the Texas Forest S ice has found that in east Texas slash pine, if it vives the first year after planting, is very hardy grows faster than any of the native species.

Specimens of trees heeled in at both State nurs were lifted from time to time during the winter observation. These gave evidence that the root the fall-planted trees continued to grow through winter, although height growth did not begin late March.

Walnut Planting Campaign in Cent States

Frank S. Betz, of Hammond, Ind., is promotin campaign for the planting of black walnuts in Indi Illinois, and Missouri in the spring of 1931. Mr. recommends the planting of the nut in the place w it is desired to have the tree grow, rather than distribution of nursery-grown seedlings. He h that under the cooperative plan he advocates the S forestry organizations of Indiana, Illinois, and Miss will distribute 10,000,000 walnuts to school child Boy Scouts, and others for planting next spring. collected this fall are to be stratified over winter distributed in March and April.

The State forester of Indiana in cooperation Mr. Betz plans to distribute stratified walnuts in spring of 1931 at a charge of $1.50 for one-half bu or $2.75 for a bushel, making one-half bushel the m mum quantity to be sent out as one order.

Mr. Betz, who retired from a manufacturing busi in 1915, has in the past few years distributed milli of forest trees and many millions of tree seed to sch children, Boy Scouts, farmers, and others. With e package of seed he gives illustrated directions planting.

◆

The Vermont Forest Service has made about 1, feet of motion pictures showing Vermont forests forestry practice. Assistant Forester C. R. Lock was the photographer. The service offers to giv lecture illustrated with films to any organization the State requesting one.

orth Carolina Forestry Association Meets

pealing to the new North Carolina Legislature to ct the cut made by the preceding legislature in try appropriations, the North Carolina Forestry ciation, meeting at North Wilkesboro, September , approved a draft of a bill that would provide for isition of lands for State forests and State parks urged that the legislature provide for adequate tenance of forestry instruction in the State college for carrying forestry education into all the high ols of the State. In order that a study might be e of the relation of forests to streamflow, erosion, the silting up of streams in the southern Appa- an and Piedmont regions the association agreed sk the North Carolina delegation in Congress to for a $50,000 Federal appropriation for this ose under provisions of the McSweeney-McNary It urged the legislature to authorize work needed mplete a land and economic survey of the State, pledged itself to endeavor to present to the public need for the proposed amendment to the State titution which would provide for classification of erty for purposes of taxation.

fficers of the association for the coming year are ident, John L. Cobbs, jr.; secretary, R. W. Graeber; ict vice presidents, K. Clyde Council (Wananish), C. Landon (North Wilkesboro), and Burnham S. urn (Biltmore).

th Forest Protection Unit Established in Texas

ew cooperative agreements entered into by the as Forest Service and a group of landowners pro- e for intensive fire protection on 250,000 acres of l in Polk, Tyler, Hardin, and Liberty Counties. owners are the W. T. Carter & Bro. Lumber Co., Kirby Lumber Co., the Texas Longleaf Lumber , and John Henry Kirby. Practically all the land well stocked with second-growth pine, and con- rable areas of old-growth shortleaf and longleaf e are included. The gross acreage that must be ered in protecting the unit is approximately 500,000. Two steel lookout towers, one 95 and one 120 feet in ght, have been erected. At four points lookout tforms have been built in tall trees steadied by wires and have been made accessible by steel ders. These, as well as the towers, have telephone nections and are equipped with maps and fire ders. The protection force will include 2 lookout n, 2 patrolmen, and 4 "smokechasers." Thirty mers will hold themselves in readiness for service as est guards.

The six units now under intensive fire protection in xas total about 1,500,000 acres. A "blanket rol" system maintained by the State forest service covers 6,500,000 acres in addition, with individual patrolmen assigned to districts of from 100,000 to 300,000 acres each.

A New Forest Nursery for New Jersey

Because greater quantities of shortleaf and loblolly pine are needed for reforesting burned areas on New Jersey State forests and because it is difficult to grow these species in the climatic conditions of the Washington Crossing Nursery, near Trenton, a new State forest nursery is to be developed in southern New Jersey. The site chosen is about 40 acres of cleared land at Green Bank, Burlington County, on the banks of the Mullica River. A portion of the new nursery will be put in seed beds in the spring of 1931.

The September inventory of stock at the Washington Crossing Nursery showed 1,600,000 seedlings and transplants available for distribution next spring. One-year seedlings were found to total 2,310,000.

Sulphuric acid is now used on all Norway and northern white pine seed beds at the Washington Crossing Nursery as a preventive of damping off, a pint of the acid being used to each 100 square feet of seed-bed surface.

◆

More than 1,000,000 seedlings are being grown in Alabama's State forest nursery in preparation for planting on nonagricultural lands owned by farmers. They are to be distributed without charge in lots of 500 or 1,000, and additional quantities may be acquired by individual farmers at the cost of growing, packing, and shipping the trees. The species grown, in order of numbers, are longleaf pine, black locust, slash pine, sycamore, laurel oak, loblolly pine, catalpa, black walnut, persimmon, Russian mulberry, and bald cypress.

◆

Another group of Georgia landowners has organized to cooperate with the State and Federal Governments in protecting timberlands from fire. The new protective unit is made up of 17,145 acres in Liberty County, with Hinesville as headquarters. This is the thirty-second timber-protective organization formed in Georgia. Its officers are J. B. Fraser, president; R. L. Rahn, vice president; and W. I. Stafford, secretary-treasurer.

◆

Deer may be shot in western North Carolina only in November and December, according to a decision recently announced by the State board of conservation and development after a public hearing on the matter. In eastern North Carolina, as formerly throughout the State, the open season for deer extends from October 1 to January 15. Another recent decision of the board closes the season for trapping fur-bearing animals in western North Carolina for two years.

Four Million Trees Available in Louisiana State Nursery

The Louisiana Division of Forestry is offering 3,000,000 1-year-old pine seedlings for sale to owners of land in the State this winter. Longleaf, slash, loblolly, and shortleaf pines are available at the State nursery at $1.50 per 1,000, f. o. b. Woodworth, La. In addition 1,000,000 hardwood seedlings are available. The hardwoods are priced at from $3 to $5 per 1,000. This year, for the first time, the division of forestry in cooperation with the extension service has arrang distribute forest tree seedlings to 4-H club mem free of charge other than that for parcel post or ex

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Smoking of tobacco and building of campfires w woodlands, and burning of brush and other rub within woodland or within 200 feet of woodland, been forbidden in Pennsylvania during the hunting season, by proclamation of the Governor.

Education and Extension

Erosion Control Demonstrated on Mississippi Farms

About 300 landowners and others saw erosion-control measures demonstrated on north Mississippi farms in the second week of September, 1930. State and Federal foresters, highway officials, specialists of the Mississippi Agricultural College, and county agricultural agents took part in the demonstrations. In Benton County the site of one demonstration was a gully 10 feet deep, in loam and clay soil underlaid with sand, that had necessitated relocation of the county highway seven years previously and was again eating into the highway as well as into a cotton field. When the drought-hardened soil at the head of the gully had been broken with dynamite much of the earth on the steep banks was loosened with the county tractor and road plow and was rolled below. Agricultural high-school students helped build brush dams on gullied areas treated in Benton and Carroll Counties. Bermuda sods were placed above the brush dams to assist in holding the soil that would be caught behind the dams. Other demonstrations were carried out in Marshall and Panola Counties. On all the demonstration areas the landowners intend to plant black locust. It was planned to continue the series of demonstrations in October and November in Lafayette, Attala, and Pontotoc Counties.

A recent survey by the Southern Forest Experiment Station covering five counties of the silt loam uplands of northern Mississippi indicated that erosion is actively in progress on 34 per cent of the land area of Marshall County, 28 per cent of Lafayette County, 23 per cent of Holmes County, and 18 per cent of Carroll County, and that in Panola County 17 per cent of the land is suffering from excessive soil wash. According to these figures erosion is actively progressing on at least 800,000 acres of land surface in this section of Mississippi. Of this area approximately 440,000 acres, it is estimated, has already been removed from cultivation. The station is now making intensive studies of certain critically eroded areas in northern Mississ with particular attention to means of reestablis vegetation, especially a forest cover, and to the rela values of different types of cover in controlling preventing erosion.

Forest Protection Campaign in Da County, Ark.

A county forestry committee composed of farm mill men, and business men had charge of a camp against forest fires that was carried out this yea Dallas County, Ark., at the instance of Exten Forester Charles A. Gillett. Letters addressed every farmer in the county told of financial gains to expected from forest protection and asked those in ested in keeping fire out of their timberlands to re Township committeemen helped to canvass the wo land owners in their communities. Farmers who nified an interest were called together for meetings which fire-protection methods were explained with help of motion pictures. More than 50 of the farm adopted fire-protection measures, and had signs erec before their homes stating that they had done Through these men and the results of their protect efforts it is hoped to reach confirmed woods burner their communities.

A 67-mile tour of the county this fall satisfied me bers of the county committee that although fire c ditions were exceptionally bad in 1930 less land burned over than usual.

Mr. Gillett is planning for similar campaigns other counties next year.

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An endowment of $200,000 recently became av able for maintaining forest research work on Harvard Forest, Petersham, Mass. Half of t amount was given by the Charles Lathrop Pa Forestry Trust.

tional Research Council Fellowships Available

ppointments to fellowships in the biological sci- s, including forestry, are to be considered by a ional Research Council board about the first week ebruary, 1931. The fellowships are open to citi- of the United States and Canada, of both sexes, possess the Ph. D. degree or have done work valent to that required for the degree. They are nded to promote research in fundamental branches he sciences, specifically through training of selected stigators. The present policy is to restrict appoint- t to applicants in the early stages of a research er who have demonstrated ability of a high order who give promise of developing individual judg- t and point of view in investigative work. The pintments are for full time; fellows may, however, ermitted to give a portion of their time to advanced hing or advanced courses of study. Fellows are pinted for a period of 12 months only, but are ble for reappointment. American fellowships y a basic stipend of $1,800, which may be adjusted individual needs. For foreign fellowships the end is $1,800 or $2,400 according to whether the w is single or married, with additional allowances over travel. Appointment may become effective ny time of year.

ersons wishing to be considered for appointment to e fellowships should send inquiries as to the mode pplication to the Secretary, Board of Fellowships in Biological Sciences, National Research Council, nd Twenty-first Streets NW., Washington, D. C.

ck Forestry Fellowships Available for 1931–32

ix or eight fellowships in forestry are offered by the rles Lathrop Pack Forestry Trust for the year 1–32. The purpose of the fellowships is "to encour- men who have shown unusual intellectual and sonal qualities to obtain training that will best ip them for responsible work either in the general ctice of forestry, in the forest industries, in the ching of forestry, in forest research, or in the elopment of public forest policy." Initiative, ourcefulness, industry, adaptability, and imagina- n are mentioned as qualifications that will have cial weight in determining the awards. No restric- ns are made as to age, educational status, or practical erience; ordinarily, however, fellowships will be nted only to those who have completed an under- duate college course or its equivalent, and only to erican or Canadian citizens. Men still in school men already engaged in professional work are gible. Grants may be made for study at a school of estry or an institute of research, on a forest under nagement, in association with forest industries, or in travel. Appointments may be made for 12 months or for a shorter or longer period, and may be renewed. Fellows will be expected to devote their full time to the work for the purpose of which the fellowships are awarded. In general the grants will range from $500 to $2,500.

Applications for fellowships must be made in writing, on a prescribed form, on or before January 15, 1931, to the Secretary of the Charles Lathrop Pack Forest Education Board, 1214 Sixteenth Street NW., Washington, D. C.

Gifts to the Oregon State School of Forestry

A fellowship in reforestation has been created in the school of forestry, Oregon State College, through a gift of $10,000 received from Mary J. L. McDonald, of San Francisco. For the current year the fellowship has been granted to Vondis E. Miller, a 1930 graduate of the school. Mr. Miller's thesis will deal with the preparation of a management plan for the school forest. A gift of $2,000 recently received from the Charles Lathrop Pack Forestry Foundation enables the school to offer a prize for which students may compete by writing articles for publication on an approved forestry subject.

Study of Washington Range Plants

The forestry and range management department of the State College of Washington is cooperating with the Animal Husbandry Division of the Washington Agricultural Experiment Station in a study of a few of the more important winter range plants of the State. A chemical study will be made of each of the plants, and quantities of each will be fed to six sheep in metabolism crates under controlled conditions to determine their digestibility and nutritive values. The study will deal first with slender wheatgrass (*Agropyron tenerum*) and Idaho fescue (*Festuca idahoensis*, syn. *F. ovina ingrata*), both of which often occur in practically pure stands.

Conservation Teaching Proposed for Public Schools of Pennsylvania

A plan to have conservation education introduced in all the public schools of Pennsylvania is being advanced by the conservation council of that State. The council proposes that the position of director of conservation and nature education be created in the State department of public instruction, and that conservation education be included by law in the curricula of all public schools from the primary grades through the high schools. It proposes further that nature leaflets and pamphlets be published by the State for the use of teachers,

Philippine Forest School 20 Years Old

The forest school of the University of the Philippines celebrated in June, 1930, the twentieth anniversary of its origin. Created in 1910 as a part of the college of agriculture, at Los Banos, Laguna, since 1916 the school has been independent of the college.

Maj. George P. Ahern was the director of forestry under whom forestry instruction was instituted in the Philippines. Royal F. Nash was the first head of the forest school and was succeeded in 1911 by D. N. Matthews.

Originally the school offered a 2-year course at the completion of which students received certificates as forest rangers. A 3-year course leading to the degree of bachelor of science in forestry was offered, also, to men having completed the ranger course. Students were maintained at Government expense during the 2-year course, the "pensionados" being bound by contract to serve in the bureau of forestry as rangers for two years after graduation. This system has now been abolished. At present the standard course is one of four years, leading to the degree of bachelor of science in forestry. Students completing the first year of this course are eligible for appointment as forest guards or guard scalers in the bureau of forestry and those completing the first two years' work are eligible for employment as rangers. Graduation from a high school or other secondary school is required for admission.

The forest school is located within the Makiling Forest Reserve, on Mount Makiling, which contains many of the principal forest types of the Philippines and affords opportunity for all the different kinds of field work required except steam logging and sawmilling. For work of this kind extensive lumbering operations are visited.

Graduates of the school number 381, of whom 232 are employed in the bureau of forestry, 17 by lumber companies, and 23 in forestry work in other countries. Ten students from China and 2 from Guam have been graduated, and 11 Filipinos have been trained in the school at the expense of the British North Borneo Government in preparation for forestry service under that Government.

Except for Arthur F. Fischer, since 1917 director of the bureau of forestry and dean of the forest school, the Philippine Bureau of Forestry is now manned entirely by Filipinos.

Local Pulpwood Market Encourages Farm Forestry in Louisiana

Farmers of Louisiana received $1,650,589 for farm timber sold as pulpwood during 1929, according to figures compiled by the Louisiana Agricultural Extension Service. This sum was paid by the six pulp and paper mills of the State to farmers in 13 parishes. One mill purchased its entire pulpwood requirements from farmers, paying them more than $800,000; anot mill purchased 80 per cent of its pulpwood from farm The average price paid at the mill is $5 a cord. M Louisiana farmers, encouraged by the excellent l market for pulpwood, are beginning to grow timber crop, says Extension Forester Robert Moore, adds that under forestry management the aver farm woodland in that State will grow one cord of w per acre annually.

County Forestry Councils at Work Maryland

County forestry councils composed of landow and timber users have been formed within the past years in six counties of Maryland—Talbot, Dorches Wicomico, Caroline, Harford, and Worcester. first definite project undertaken by each of the coun with the guidance of the University of Maryl extension service, was an idle-land survey and a pla ing campaign. In five of the counties the numbe forest trees planted during the past two years ra from 31,000 to 87,000. The extension service pl to issue from time to time a mimeographed news-le containing reports and suggestions on forestry developed by members of the councils, the first num of which appeared in September of this year.

Idaho Legionnaires Undertake Forest Educational Work

The American Legion, Department of Idaho, cooperate in public forestry educational work un the terms of resolutions adopted at its twelfth ann convention, held at Idaho Falls in August. Legion proposes to obtain educational material relat to the forests and forest resources of Idaho from Idaho State School of Forestry, the State fores and the United States Forest Service, and through various posts to distribute this material to Boy Sco Camp Fire Girls, chambers of commerce, commer clubs, and public schools. In accepting its conser tion and reforestation committee's report the c vention approved recommendations that each make a study of conservation and reforestation pr lems of its locality and report its findings to the partment, and that the department encourage Id municipalities to establish community forests for protection of watersheds and wild life and for rec tional purposes. The report urged that the Leg continue to encourage the planting of trees on sch grounds, municipal parks, and playgrounds and al public highways, and recommended reforestation burned-over and denuded areas by the Boy Sco the Camp Fire Girls, and similar organizations. final objective outlined by the committee, on wh Franklin Girard served as chairman, was the devel ment in each individual Idaho citizen of a consciousn rest fire danger and of a feeling of responsibility bserving precautions against fire and warning rs to do so.

r-H Club Champions Attend New York Forestry Tour

good work on 4-H club forestry projects 28 New boys won the privilege of attending this year's try tour of the New York State Conservation artment. One of the boys was sent as State er in the second-year (forest-appreciation) project the others as county winners in either the second- or the first-year (tree-planting) project. The ' expenses were paid with funds supplied by al forestry and conservation organizations, a ersity, a newspaper, and a chamber of commerce. en 4-H club leaders likewise participated in the , which had a total attendance of 150. The tour ed at the Saratoga State Forest Nursery and con- d for four days with visits to private and public t plantations, in which the trees were of many ties and of ages ranging up to 44 years, throughout eastern and central Adirondack region.

unior Patrol Effective in Louisiana

ur-H club boys patrolling 10,000 acres of land he vicinity of Fisher, Sabine Parish, La., have ed themselves as efficient as adult patrolmen, says nsion Forester Robert Moore. In the year ending 30, 1930, the 18 fires occurring on the area were by the boys to an average of 14.16 acres each. average acreage per fire for the whole of the ection unit including the area protected by the was 60.6.

Junior patrols of 4-H boys have been an integral part of the State forest fire protection system in Louisiana since 1927. They are paid 1 cent for each acre in the area patrolled and a bonus of $25 if less than 1 per cent of the area is burned. In some areas of unusual hazard compensation is at a higher rate. In communities where junior patrols have been organized their activities have markedly increased the interest of the public in fire prevention, Mr. Moore has found.

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Forestry oratorical contests were conducted by the Tennessee Forest Service this fall for the second time in the schools of Fentress County and for the first time in the schools of Cumberland and Morgan Counties. Seventh and eighth grade pupils were eligible. For the final contest, held in the county seat following elimination contests in district centers, prizes totaling $40 were raised by popular subscription in each county. Forestry information material provided by the State forest service for use in preparing orations was distributed to 941 pupils.

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The Institute of Paper Chemistry founded a year ago as a graduate school affiliated with Lawrence College, Appleton, Wis., announces that 17 college graduates, representing 15 educational institutions and 12 States, have enrolled for its second term. A research fellowship established in the institute by the Masonite Corporation of Laurel, Miss., has been awarded to E. F. Foreman, a graduate of the University of Illinois. This fellowship is established for three years.

Forest Service Notes

timates Enlarged as to National Forest Road and Trail Requirements

By G. H. LAUTZ, United States Forest Service

stimates as to the mileage of roads and trails red for inclusion in the road and trail systems pro- d for the national forests were increased during the year. An addition of 691 miles was made to the vious estimate of forest highways, that is, roads while of value to the forests are important pri- ily to the States containing the forests and to nties and communities within and adjacent to the sts; 5,904 miles were added to the estimate of forest elopment roads, that is, roads required for the pro- ion, administration, development, and utilization he national forests; and the estimate of trails was increased by 18,681 miles. The new totals are 16,023, 51,703, and 149,768 miles, respectively. The expenditures required to complete the three systems are estimated at $166,097,400, $60,497,200, and $5,993,600, respectively, or at a total of $232,588,200. The cost per mile of the required construction will be approximately $19,057 for forest highways, $1,911 for forest development roads, and $130 for trails.

The past fiscal year saw 1,726 miles of roads and 6,175 miles of trails constructed, and 19,898 miles of roadway and 65,785 miles of trails maintained. This represents an expenditure of $10,356,172, of which $8,883,595 was contributed by the Federal Government and $1,472,577 by cooperating agencies.

The total expenditure on forest roads and trails to July 1, 1930, was $111,179,871, representing $89,122,195 specifically appropriated for road construction,

$2,152,933 of other Federal funds, and $19,904,743 of cooperator's funds. Through this expenditure 18,455 miles of roads and 53,452 miles of trails have been constructed. The construction of major roads, which is handled by the Bureau of Public Roads, has cost, on an average, $14,368 per mile. The minor roads, constructed by the Forest Service, have cost $1,327 per mile. During the fiscal year 1930 the cost per mile averaged $26,121 for major construction and $1,154 for minor construction. Trails to date have cost an average of $171 per mile; for the past fiscal year they cost approximately $141 per mile.

With all this construction, there remain 2,037 townships within the boundaries of the national forests in the Western States that are without roads of any kind. Idaho contains a larger number of such townships than any other State, 383; Montana contains 285.

At present $12,500,000 is authorized annually for construction and maintenance of roads and trails included in the transportation systems planned for the national forests. Of this amount Congress has set aside $9,500,000 for forest highways and $3,000,000 for forest development roads and trails.

Motor Equipment on the Big Springs Fire

By J. F. CAMPBELL, United States Forest Service

In fighting the Big Springs fire on the Deschutes National Forest, Oreg., in July, 1930, we gained some experience in the use of large equipment that should interest others who are responsible for fighting fire in country where it is possible to use motor equipment.

This fire originated and "blew up" on lands of the Shevlin-Hixon Lumber Co., about 1½ miles from the national forest boundary. The cover at this point was an almost pure stand of western yellow pine with an undergrowth of Ceanothus and bitter brush. At the time of the "blowup" the lumber company was using on the fire line a Fordson tractor, with treads operating somewhat like those on a caterpillar, and a Killifer plow. The Fordson was being operated on gentle slopes roughened by occasional outcroppings of lava rock. The machine would not work satisfactorily under such conditions, and was soon retired. Officials of the Shevlin-Hixon Co. then requested the Forest Service, which had offered to give any possible assistance but up to this time had taken no active part in the suppression work, to put its motor equipment to use. This equipment, consisting of a 2-ton caterpillar tractor and a Killifer wheel plow, had already been moved to the site of the fire and was put to use immediately.

The Killifer plow, in light soils, is capable of digging a furrow or trench about 20 inches wide and about 8 or 10 inches deep. It is fitted with a lever which will raise the plow blade above the soil surface so that solid rocks or logs may readily be passed over. Pine logs up to 8 inches in diameter are readily broken up by
the plow if solidly lodged against trees or othe
stacles. To operate the outfit one man is requir
drive the tractor and one to ride the plow for the
pose of holding it deep in the soil.

Between 7 p. m., when this equipment was firs
into use, and midnight, 2½ miles of fire line was
structed and held with the support of an inadec
force of men. Electric headlights were used.
fact that this line held is attributed largely to the
of timber and to the fact that the line was bui
night, when the fire was burning slowly. By 6 o'
the following morning another 2½ miles of line
been constructed and held, with the same force.

On the second day the fire spread into rou
brushy lodgepole country where the available f
were entirely inadequate to control it. Since the
was spreading toward the national forest bound
the lumber company requested the Forest Servi
assist with administrative control. Immediate
camp was established and a start was made in roun
up men.

Meanwhile the caterpillar and Killifer were oper
constantly and with all possible expedition. Du
the forenoon of the second day approximately 3 r
of trench was built. Fully one-half of this line
lost, not because of the quality of the work done
the motor equipment but because of the late sta
collecting and organizing man-power to perform
that can not be done with machinery.

Not until the morning of the third day of the
was a sufficient organization available to carry
effective suppression work. A second 2-ton ca
pillar and plow had been moved in during the ni
and enough men had been moved to the fire to form
organization that operated in the following man
(1) Ten experienced axmen and fallers were dispatc
to clear a right of way for the tractors. (2) The
tractors followed, one behind the other, the sec
widening the trench dug by the first. (3) A crew
20 "swampers," most of whom were experienced fa
and axmen, following the tractors, widened the cl
ance and shoveled out inflammable material that
fallen into the trench. (4) Behind the "swampe
came a backfiring organization of 20 men, 7 of th
equipped with Hauck torches and the remainder
shovels. The duty of this crew was to backfire an
hold the line until it could be taken over by the pa
force. (5) A patrol crew of about 100 men was
organized that each man was assigned a definite p
of line to take over immediately after the backfir
On the third day of the fire this organization
structed and held between 4 and 5 miles of line, plac
the fire under immediate control. This day's w
was performed in comparatively rough country cove
with a dense stand of lodgepole pine and white fir
with heavy underbrush.

Our experience in fighting this fire indicates t
without adequate clearing, backfiring, and patroll

s the operation of tractors is a complete waste of and energy. Moreover, men and horses are nec-y to keep the tractors supplied with gasoline and Tractors can be operated at this kind of work for about 5 hours at one filling. Ordinarily, we have d, a crew of at least three packers is necessary for machine.

nsiderable difficulty was encountered in keeping h from clogging the plow. It was necessary to frequently and clear the plow either by lifting it the ground or by pulling the brush out by hand. h valuable time was lost in this way. At the sug-on of Fred Brundage we have since developed a seneck" which is attached to the plow. This seneck" provides a greater clearance and allows brush to pass freely without clogging. We have able to improve our plows, also, by providing r moldboards with more concave faces. A plow is type makes a much more satisfactory trench can be operated at higher speeds. Recent tests the "gooseneck" and this special plow in dense ds of manzanita brush have given very satisfactory ts.

interesting illustration was afforded of the com-tive value of a 2-ton caterpillar and a 60 cater-r, when the Shevlin-Hixon Co. shipped one of the r machines from its logging camp to the Big ngs fire. Behind this larger machine a heavy og was chained and allowed to drag. A very factory trench was built in this manner on the ern yellow pine and cut-over land. A rock 36 es in diameter likewise gave good results as a in this country. The heavier caterpillar was d to have a great advantage over the 2-ton ma-e because of its greater power and its ability to on rougher ground. However, it consumes a t deal more fuel and requires much greater clear-in dense stands. It is much harder to move, , than the smaller outfit.

ur 2-ton tractor and Killifer plow are transported 2-ton truck. Drills are held from time to time in ing and unloading this equipment. Our machines e been unloaded and put into operation in a period ix minutes.

Timber Markets in Porto Rico

By W. P. Kramer, United States Forest Service

inding markets for forest products is not one of my blems as supervisor of the Luquillo National Forest, R. Within 10 miles of the forest boundaries are 11 nicipalities having a total population of 172,142, ch is a much greater number than the Luquillo, h its present area of 12,443 acres, could adequately ply with fuel wood, charcoal, and other forest ducts. As it now stands, moreover, the Luquillo is rotective rather than a productive forest. The pre-itous slopes on which it is located must be clothed permanently with a forest cover, and only a small part of its present commercial volume should ever be utilized. However, if the areas surrounding the present forest are purchased by the Government and planted to rapid-growing trees capable of producing fuel wood, construction timbers, and cabinet woods on short rotations, the Luquillo should yield considerable quantities of these products, which would at all times find a ready sale throughout the island. Many factors favor the intensive practice of forestry on an enlarged Luquillo on a profitable basis: There is a large population requiring a continuous fuel supply; domestic forest supplies are inadequate to meet the needs of the island's industries; general agriculture is greatly hampered for lack of a cheap local supply of wood; climatic conditions are highly favorable to rapid tree growth; utilization of all parts of the tree is complete; and labor is abundantly available at relatively low rates.

The native woods are preferred to imported woods for stakes, posts, ties, and construction timber of all kinds, because of their durability, although at present their scarcity makes it necessary to substitute imported pine, fir, and redwood. Although none of the native woods are satisfactory for the manufacture of box shooks for packing fruit and vegetables, two introduced species, African tulip (*Spathodea campanulata*) and Santo Dominican pine (*Pinus occidentalis*) are suitable for this use.

The existing forest resources of the whole of Porto Rico, which with its dependent islands has a gross area of only 3,435 square miles, would constitute not more than a 5-year supply for the island's present population of 1,543,913. The paucity of the domestic timber supplies is strikingly illustrated by the volume of the island's imports of forest products. In 1929 the people of Porto Rico, always poor and still further impoverished by the San Felipe hurricane of 1928, imported forest products costing $4,517,850. (Of this amount all but $64,810 represented imports from continental United States.) This was $744,810 less than they had spent on forest-products imports in 1928. The difference was due largely to a sharp falling off in imports of box shooks, resulting from the hurricane's destruction of the citrus crops.

Immediately following the hurricane large quantities of down timber were manufactured into charcoal and dumped upon the market, resulting in a material decrease in prices. The retail price of three 5-gallon tins of charcoal on the San Juan and Rio Piedras markets dropped from 60 or 75 cents to 25 cents, from which point it has now risen to 35 cents. Previously, charcoal demand and prices had varied very slightly over a period of eight years. Prices on timber have not been reduced, although a considerable number of good timber trees were toppled by the storm. This is explained by the fact that whereas trees of the inferior species used in charcoal manufacture will rot if not manufactured promptly after they are felled, the valuable timber used in construction work and for bull carts, piling, furniture, etc., remains salable for years after felling if it is kept in a dry state. The overstocked condition of the charcoal market will probably prevail for another year or 18 months. A great many damaged trees of charcoal species are still standing or are leaning or lying over each other, and will thus last for a much longer period than if they were in contact with the soil. Another basic reason for low charcoal prices continuing over a long period of time is the fact that for many generations the *jibaro*, or mountain laborer, has been accustomed to cutting wood and making charcoal for sale wherever he needed a few extra pennies. Facing hard times for the next few years, he will be found making and selling charcoal in order to eke out a living.

Planted Yellow Poplars Yield to Sprouts on Ohio Hardwood Area

Yellow poplar has failed in competition with sprout growth of native hardwoods on an area in southern Ohio where it was planted in 1928, two years after clear cutting of the second-growth timber and immediately after the burning of the brush and of the young volunteer stand. The test was made by foresters of the Central States Forest Experiment Station and the Mead Pulp & Paper Co.'s forester, K. A. Swenning, on 10 acres of that company's property in northeastern Pike County. The soil is of medium depth, excessively drained but, according to the composition of the second-growth stand, moist enough to grow yellow poplar. A stump tally on the area showed that the second-growth stand had consisted chiefly of white ash, black oak, bitternut hickory, white oak, mockernut hickory, black locust, and black walnut. The burning, on April 5, 1928, killed all sprout growth and consumed most of it.

Sprouting has been more vigorous since the burning than it was in the two years that followed the cutting. The third season found the poplars completely overtopped by a vigorous growth of sprouts in which black locust predominated. Slippery elm was especially prevalent. On a sample plot of one-half acre 55 poplars had survived out of about 500 planted. Sprouts of good tree species on the half acre numbered 1,024. The average height of the poplar was 2.1 feet, as compared with an average height of 11.8 feet for black locust. All the poplars were spindling and lacked vigor, so that it appeared useless to attempt to release them by cutting back competing sprouts.

Less vigorous sprouting could be expected after the cutting of old-growth hardwoods of the same species than occurred in this instance after the cutting of second-growth timber, and the 2-year delay that occurred between cutting and burning accounts in part for the great number of seedling sprouts.

Effect of Composition on Yield of Coni Stands in the Sierras

By L. H. Reineke, United States Forest Service

In even-aged, second-growth stands of mixed coni in the California Sierras, constituents of which are w ern yellow pine, sugar pine, Douglas fir, white fir, and cense cedar, the presence of a greater than average p portion of western yellow pine and sugar pine tend make the yield greater than the average, and a grea than average proportion of Douglas fir tends tow yields below the average. These conclusions are ba on a detailed analysis of data from 225 sample pl measured by Duncan Dunning, of the California For Experiment Station, and others. On these plots five species were mixed in many different proportio

The ages of the stands measured ranged from 45 90 years, but in most cases were between 45 and years. Average yield, as indicated by total ba area, was first determined, and departures from t average were correlated with the proportions in wh individual species were present. The following ta indicates the average composition of various types which one or two of the conifer species of the Sier predominate, and shows the yield, in percentage average yield, for stands 50 to 60 years old on sites average quality.

Type	Percentage of total basal area represented by—					Yield in percentage of
	Western yellow pine	Sugar pine	Douglas fir	White fir	Incense cedar	
Sugar pine	10. 3	59. 2	6. 4	9. 6	14. 5	
Western yellow pine	76. 9	3. 0	5. 4	5. 3	9. 4	
Western yellow pine-sugar pine	39. 2	36. 8	3. 6	9. 6	10. 8	
Western yellow pine-white fir	40. 0	3. 5	8. 7	34. 3	13. 5	
Sugar pine-white fir	1. 2	28. 5	3. 5	62. 0	4. 8	
White fir	2. 7	2. 9	10. 0	81. 2	3. 2	
Douglas fir-white fir	7. 5	3. 1	44. 5	43. 2	1. 7	
Douglas fir	8. 8	2. 8	78. 9	8. 6	. 9	
Average, all plots	24. 8	8. 2	36. 1	24. 7	6. 4	

The yield of stands with high percentages of su pine and western yellow pine is shown to be 10 to per cent above the average for all the types represen in the table; that of stands high in white fir is ab average, and that of pure Douglas fir stands is 12 cent below average. For the compositions shown range in yield is from 113 per cent to 88 per cent of average. For stands composed 100 per cent of west ow pine and stands composed 100 per cent of glas fir the yields would be 123 per cent and 75 cent, respectively, of the average.

National Forest Receipts

et receipts from the national forests in the fiscal ending June 30, 1930, were $6,752,045, the est in Forest Service history, exceeding the receipts 929 by $452,000. Timber sales brought in $281,000 e, and grazing $203,000 more, than in the preced- year. National forest receipts for the first quarter he fiscal year 1931 were $1,197,831, which falls t by nearly 24½ per cent of matching receipts for same period of last year.

anges Approved in Forest Service Nomenclature

By W. A. Dayton, United States Forest Service

n September 26, 1930, announcement was made t the Forester had approved 36 changes in Forest vice nomenclature as standardized by the Check of the Forest Trees of the United States: Their nes and Ranges (Department of Agriculture Mis- aneous Circular 92, published in 1927). The pur- e of the changes was to harmonize Forest Service nenclature with that of the Bureau of Plant Industry other bureaus of the Department of Agriculture. ne of the species involved are of more than secondary ortance as timber; most of them are usually shrubs at most, small trees.

he 18 changes in Latin nomenclature (mostly or) include 3 made in conformity to the rule of rity, 1 which rejects a homonym, 10 recognizing species forms which the check list held to be sub- ies, 1 recognizing as a genus a group which the k list held to be of subgeneric rank, and 3 which inguish native western United States plants from ted eastern or Mexican species. Of the changes in lish nomenclature several affect misnomers or finite names (as horsebean for a kind of paloverde, frijolito for the mescalbean) and names that were biguous as applied to shrubby congeners of the rescent species with which they are identified (as ntain willow for Salix scouleriana, and Texas verde for Cercidium floridum). Madroño has been licized to madrone; Rocky Mountain shin oak has changed for the sake of brevity to wavyleaf oak; kberry has been made more definite by adding the ix Douglas; Oregon myrtle has been discarded in r of the more accurate California-laurel as a com- name for Umbellularia californica; and flannel- h has been adopted as in better popular usage than ntain leatherwood for Fremontodendron.

opies of the announcement listing the changes may procured by application to the Forest Service, shington, D. C.

Standardizing Range Plant Names for the Forest Service

By W. A. Dayton, United States Forest Service

Since 1907 the Forest Service has been collecting and preserving carefully annotated range plant specimens and analyzing data in regard to them. This project is fundamentally related to the administration of national forest range areas and to research in range management; as ecological concepts become more widely accepted in forestry it is more and more appreciated as having significance in connection with silvical research and with forestry generally.

Anyone who has not made a first-hand study of the vegetation present on the national forests would hardly credit its complexity. It comprises many thousands of species, of widely varying habits, requirements, and properties, a surprisingly large number of which have practical significance. Relatively few of the range plants are covered in the two currently accepted American nomenclatural guides, Sudworth's Check List, which deals ostensibly with forest trees only, and Standardized Plant Names, which purports to cover horticultural plants only. To standardize the nomenclature of national forest range plants has therefore been a real problem.

Although the value of stability and uniformity in plant nomenclature is generally recognized, in my opinion relatively few fully recognize the fact that proper nomenclature is essentially a research problem and is necessarily an objective rather than a fait accompli; that there never was and never can be a czar in science; that any individual, skilled or unskilled, anywhere, at any time, in any language or dialect, may publish a new plant species or genus that will affect botanical nomenclature for all time; that, save for a relatively few splendid exceptions, the published floras of American States and regions are woefully lacking in nomenclatural coordination; that many leading systematists regard English plant nomenclature or attempts at its standardization with apathy, if not with derision; that a man studying the nomenclature of trees ought not to forget shrub and herb nomenclature, and the writer of a State or regional flora should not ignore the floras of other States or regions, the flora of the country as a whole, or allied floras of other countries; that a great volume of tedious, thankless, time-consuming work must be done by persons possessing a broad field as well as closet knowledge of plants, together with a knowledge of languages and of botanical history and literature, before English plant nomenclatural standardization worthy of the name can be attained.

Authority for the Latin nomenclature in Forest Service range plant studies resides in the staff of admirable systematists working under the immediate supervision of Frederick V. Coville, of the Bureau of Plant Industry, one of the most eminent of American botanists. Doctor Coville is recognized, also, as the Department of Agriculture's outstanding authority on English plant nomenclature.

As a result of the efforts of the Forest Service Division of Range Research to iron out discrepancies in English range plant nomenclature and to lay a framework for eventual standardization of the common names of the numerous plants with which it deals, a booklet of notes on range grasses was printed in 1914, and a preliminary check list of common or vernacular names of national forest range plants was issued in typewritten form in 1919. In 1929 the Forest Service organization in region 4 (the intermountain region) issued a printed list of standard names of the more important range plants of that region. Results of the cooperative efforts of Doctor Coville and myself toward standardization of the English nomenclature of western range plants have been shown from time to time in various publications by other writers, will undoubtedly affect the 1933 edition of Standardized Plant Names, and may also, eventually, result in a published check list.

In selecting an English name for a given plant consideration should be given to usage, appropriateness, individuality (i. e., avoidance of ambiguity), botanical relationships, brevity, euphony and taste, and visual qualities of the name form itself. In such work the division of range research has had recourse to the literature of the subject, to Forest Service records (including correspondence, annotations accompanying specimens, etc.), and to personal experience, as well as to cooperation with outside agencies. When the need arises for fitting an acceptable English name to an unnamed or untenably named genus or species we have had recourse to three expedients: (1) Anglicization of the technical name, resulting in such names as angelica, bistort, collomia, and eupatory; (2) more or less free translation of the Latin or Greco-Latin name (e. g., starleaf for Astrophyllum, pitchfork-weed for Dicranocarpus, sweetvetch for Hedysarum, longtube for Macrosiphonia, blackfoot for Melampodium, and wolfberry for Lycium; and (3) invention, which is especially invited when the plant has a striking quality or an unwieldy Latin name or both (e. g., white brittlebush for Encelia farinosa, fendlerbush for Fendlera, and summit willow for Salix saximontana).

In suggesting English plant names it is well to follow the principles set forth in the preface to Standardized Plant Names. An additional principle requires that some such word as "little," "small," or "pygmy" be used in preference to "dwarf" for small species, "dwarf" being a horticultural term applicable to a diminutive form or state of any species. The term "common," also, should be avoided so far as possible. This term is essentially illogical as a species name, its use frequently giving rise to the anomaly of the rarest plant in a given locality being referred to as "common."

Western Tree Seed Crops of 1930

The cone crop of 1930 on national forests of Pacific Northwest is good for most species, and Douglas fir is the best since 1923. In Califor national forest officers report an abundance of ince cedar and California red fir seed, a very heavy cro mountain hemlock seed especially at the timber l and a medium crop of sugar pine and western wl pine seed. The white fir seed crop in Californi reported missing.

Seed production of conifers in the northern Ro Mountain region was poorer in 1930 than in any ot year since the Forest Service began to make phenol cal observations there about 20 years ago, accord to a report by Assistant Silviculturist Jacob Roe jr. The Douglas fir seed crop was a complete fail above an elevation of about 8,500 feet, as a result killing spring frosts. At lower elevations it greatly reduced as a result of wet weather. Engelmann spruce cone crop was likewise deficie For some reason this was an off year for spruce se very few flowers developing. In the Pikes Peak reg the western yellow pine seed crop failed completely

Mount Whitney Trail Opened

A foot and horseback trail to the summit of Mo Whitney, Calif., was officially opened to public September 5. With its 14,496-foot elevation this su mit is the highest point in continental United Stat Mount Whitney stands on the boundary between Inyo National Forest and the Sequoia National Pa The trail starts at the mouth of Lone Pine Cany near Lone Pine, Calif., in the Owens Valley, and r for some 12 miles through the Inyo National For to the summit of the Sierra Nevada, then crosses i the Sequoia National Park and continues several mi to the summit. By this route the trip from Lone Pi to Mount Whitney and back can easily be made horseback in one and one-half days. The trail was c structed by the Government at a cost of $25,000.

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National forest area figures as of June 30, 1930, sh a decrease of 589,023 acres in gross area and an increa of 340,297 acres in net area. Eliminations aggregat 964,725 acres; additions, 401,080. Land exchang resulted in a net gain of 190,576 acres, and purchas totaled 417,064 acres.

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Cone pickers working on the Lassen National Fore Calif., between the 1st and 15th of September collect 8,200 pounds of Jeffrey pine and 6,500 pounds of weste yellow pine cones. The Forest Service paid 1½ cen a pound for all first-class cones. The seed will be us in the nursery maintained by the service at Susanvil Calif.

General Forest News

ommittee Studies Diseases of Wild Animals

By C. E. **Rachford**, United States Forest Service

or many years observations on the condition of our life have pointed to considerable prevalence of ase among game and other wild animals. From to time we have had examinations of wild animals e, and the results have proved conclusively that ase of one form or another was largely responsible the low increase or gradual depletion of certain ls. The need for study of the whole situation in rd to wild-animal diseases and for development of tical means of control has led to the formation of a mittee consisting of representatives of the Bureau nimal Industry, the Bureau of Biological Survey, National Park Service, and the Forest Service. urice C. Hall, principal zoologist of the Bureau of mal Industry, is chairman.

t the first meeting of this committee, on October 10, tor Hall indicated his belief that as the wild animals concentrating on smaller and smaller areas they are oming affected by an increase in parasites such as rcrowded conditions produce in the case of domestic mals. Doctor Hall discussed recent studies of the ases of elk, especially ticks. It was brought out t investigations of scabies among Rocky Mountain ep and elk have been inadequate to determine ether or not the disease is communicable from moun- sheep to domestic sheep or vice versa.

Doctor Hall indicated that in an investigation on one he national forests deer showed a surprisingly large centage of cases of cysticercosis of the liver caused a bladder worm commonly called Cysticercus tenui- is, a larval form of one of the dog tapeworms, enia hydatigena. This worm occurs in the mesen- ies of the deer as a fully formed tapeworm. In an estigation by W. T. Huffman, of the Field Inspection vision, Bureau of Animal Industry, and Doctor ll, it was assumed that the coyote was the important rier of the adult tapeworm responsible for this cysti- cosis in deer. Post-mortem examination of three otes killed on the forest showed one to be a carrier. ese coyotes were all young, and it is probable that worms are harbored by a much larger percentage of lt coyotes. Control, for the present, is a matter of ping down the coyote population by killing. These r also harbor a larval tapeworm in the heart, and s tapeworm develops to an adult in various wild nivores. Here also, control is a matter of keeping wn the carnivores.

In the past two years numerous cases of lungworms in Rocky Mountain sheep, deer, and other wild ruminants, associated at times with the deaths of these animals, have come to the attention of the Bureau of Animal Industry. In most of these cases, though not in all, Gerard Dikmans, of the zoological division, has found the worm to be a very fine red worm known as Muellerius capillaris.

A species of lungworm closely related to M. capillaris was present in Rocky Mountain sheep dying in Colorado. An investigation by Doctor Hall brought to light certain facts which seemed to point to an interesting hypothesis. The sick sheep had a cough, presumably associated with the lungworms, but in addition they were barely able to walk away from an observer and walked as if weak in the hindquarters. There was evidence that these sheep had been eating the bones of old carcasses. This brought to Doctor Hall's mind the work of Sir Arnold Theiler in South Africa showing that lameness in cattle was associated with a toxic condition due to toxins produced by anaerobic bacteria in old bones, and that cattle ate these bones because they were suffering from the effects of a mineral deficiency in their diet. Somewhat similar conditions have been found on national forest ranges where domestic livestock were obtaining an inadequate quantity of mineral salts.

In the rearing of quail for stocking there has been much trouble from coccidiosis. Investigations on this problem have been conducted by Herbert Stoddard, of the Biological Survey, and E. B. Cram, of the Bureau of Animal Industry, and others are under way in different parts of the country.

One of the most interesting discoveries reported at the meeting was the tapeworm infestation in trout in the Yellowstone Lake. Parasitologists ascertained that a certain larval tapeworm occurring in the viscera and flesh of the cut-throat trout would develop to an adult tapeworm, Dibothrium cordiceps, in the intestine of the white pelican when infested trout were eaten by the pelican. Trout in turn became infested indirectly from the tapeworm eggs in pelican droppings deposited in water. This parasite appears to be present in Wyoming, Montana, Idaho, and Oregon, and probably is present in other States.

Hemorrhagic septicemia has been found to be present in deer and antelope, and investigations have strongly indicated its presence in other game animals. Game reports from forest officers are replete with observations suggesting still other maladies among our wild animals.

It is clear that all animals captured for restocking purposes should be carefully inspected by competent authorities before they are transplanted.

The committee on diseases of wild animals proposes to make a preliminary survey of the results of all investigations that have been made in its field in the United States and then to develop a program of research. Field officers have been requested to submit information to be presented to the committee at its next meeting in December.

Predacious Beetle Introduced in Northwest in Effort to Control Tussock Moth

Two shipments of the European ground beetle (*Calosoma sycophanta* L.) were sent across the continent from Massachusetts in June of this year to be liberated in a tussock-moth infested stand of Douglas fir and lowland white fir near Northport, Wash. They were sent from the Gipsy Moth Laboratory at Melrose Highlands, Mass. Of the 1,200 beetles shipped 1,004 survived the trip. If this insect can withstand the rigorous climate of northeastern Washington it is hoped that, with a few more shipments, it will multiply so as to become an important factor in the control of the Douglas fir tussock moth (*Hemorocampa pseudotsugata* MacD.), which has been doing a great deal of damage in the Northport region.

Calosoma sycophanta is a beautiful green-gold beetle averaging slightly more than an inch in length. Although it is called a ground beetle, both the adult and immature forms will climb trees in search of their prey, which consists principally of caterpillars. In Europe, where it is native, the beetle preys on the gipsy, brown-tail, and nun moths and on the European pine sawfly. It was first introduced in this country in 1905 to help control the outbreak of the gipsy moth in Massachusetts.

This is the first instance in which the Forest Insects Division of the Bureau of Entomology has attempted to control an outbreak of a forest pest in a western State by introducing a predator.

* * *

The western bark beetle laboratory maintained by the United States Bureau of Entomology at Stanford University, California, has been moved to the University of California, at Berkeley. Laboratory and office space has been allotted to J. M. Miller, senior entomologist in charge, and his staff in the new Giannini Hall, which houses the university's department of forestry and the California Forest Experiment Station.

Slash Decay on Forests of the Southea

Excessive drought appears to have held slash decay a standstill this year on a coastal plain forest ne Franklin, Va., visited by Perley Spaulding, fore pathologist of the United States Bureau of Plant I dustry. Examined in October, both hardwood a loblolly pine slash of last winter's cutting was fou to be practically sound. Normally, it appeared, sap r would have been well begun. From examination older slash Doctor Spaulding concluded that in th vicinity the presence of logging slash does not usual involve extreme danger of forest fire for as long as thr years; by the third year the leaves, twigs, and small branches are well rotted and have largely fallen to t ground. Since decay is so rapid, it does not seem him that lopping of the slash could very materially ha ten the passing of the extreme danger point. Anoth reason for questioning the efficiency of lopping as decay-hastening measure on such a forest is the appa ent prevalence of waterlogging.

On chestnut and mixed hardwood areas on th Pisgah National Forest, N. C., Doctor Spauldi found evidence that in most places on these areas th extreme danger of slash fire passes in three yea That period suffices for the rotting and disappearan of leaves, dead twigs, and branches less than an inch diameter of all the timber species most numerous in th stand. Here slash is not usually dense, and in mo cuttings some shade is left. The best timber and th densest slash are on the cooler and more moist slope In this situation it does not seem that lopping of slas can decidedly shorten the already short rotting perio and it may lead to waterlogging. On warmer a drier slopes lopping may hasten decay without wate logging, but at a rather high cost. There is dange also, that if fire occurs lopped slash will intensify th damage by concentrating the fire near the ground.

Long-Bell Co. Collects Tree Seed Many Species in Many States

One or two portable seed-extraction plants are be developed by the Long-Bell Lumber Co. for use i the Northwest, supplementing the company's pe manent plant at Longview in which are handled see of all the important forest tree species of Orego Washington, British Columbia, and Alaska. A extraction plant that can be moved from one center cone occurrence to another will make it less difficu to obtain, in any given year, seed from the best typ of forests producing seed in that year. Seed of wester yellow pine, sugar pine, incense cedar, the true firs the Sierras, and other conifers native to norther California and southern Oregon are extracted by su ving at the Long-Bell nursery plant at Tennant, lif. Southern pine seed collected by Long-Bell ployees in Georgia, Louisiana, Arkansas, and Texas extracted at a plant at Ludington, La. For all seed it handles the Long-Bell Co. records the irce and climatic conditions at source, thus enabling purchaser to select seed that originated on a site mparable to the site on which he desires to plant.

orthern Great Plains Station Cooperates in Thousands of Shelter-Belt Plantings

By Ernest J. George, United States Bureau of Plant Industry

In semiarid sections of North and South Dakota, ontana, and Wyoming 3,207 farmers have established elter belts with the cooperation of the Northern eat Plains Field Station, maintained by the United ates Department of Agriculture at Mandan, N. Dak. ich of the shelter belts was established on a farm iere irrigation was not practiced. The station has en cooperating in this work since 1916. In supplying farmer with the planting stock, planting plans, and vice required it has sought not merely to benefit m individually but, with his cooperation, to show ighboring farmers what results may be expected ien shelter-belt plantings are correctly made and red for on farms such as theirs. For this reason the 0 to 300 plantings in which the station cooperates ch year are scattered over the 112 counties which it rves; five is the largest number established in any unty in any one year. Usually it is necessary to oose among 400 or 500 applications. Some repre- ntative of the station visits each applicant to deter- ine whether the land on which it is desired to estab- h a shelter belt is in a good state of summer fallow d, if it is, to gather the data necessary for preparing planting plan.

The 3,172,940 trees which the station has distributed r shelter-belt planting in the past 15 years were all own in its own nursery. The hardwoods were pro- iced from seed collected locally. Conifers growing at e station have now begun to produce cones, and in e future are expected to yield most of the conifer ed required. The hardwoods used are "Northwest plar" (*populus* sp.), boxelder, green ash, Russian- ive, Chinese elm, American elm, and caragana. nifers used are western white spruce (*Picea glauca ertiana*, known to horticulturists as Alberta spruce Black Hills spruce), blue spruce, jack pine, Scotch ne, and western yellow pine. Hardwoods are shipped 1-year or 2-year seedlings from 15 to 36 inches in ight; pines are shipped as 2–2 year transplants and ruce as 2–3 year transplants.

In general not more than 1,000 trees are furnished r an individual planting. Plantings are of sufficient ngth to give farmsteads, gardens, or orchards suitable otection from winter winds and drifting snow. In width they vary from 2 to 12 rows. Conifers are not usually furnished until the hardwood planting is 2 or 3 years old. They are then used in making an addition on the lee side of the hardwood planting. Because of the difficulty of growing conifer stock under dry-land conditions, only enough conifers are furnished to each farmer to plant two or three rows.

Usually from 80 to 95 per cent of the hardwoods planted survive to the first fall after planting. The survival of conifers varies from complete failure in unfavorable years to 85 per cent in years when conditions are more favorable.

In an effort to determine how far apart trees should be planted in the shelter belts to make the most satisfactory growth and maintain sufficient crown density to break the force of wind and snow and develop shade that will prevent excessive growth of grass and weeds, various spacings have been tried out in these demonstration plantings. The spacing was 4 by 8 feet in plantings of 1916–1919, 6 by 6 feet in 1920 and 1921, 6 by 8 feet in 1922, 6 by 10 feet in 1923–1926, and 6 by 12 feet in 1927–1930.

In 76 counties included in the area served by the Northern Great Plains Station the station deals with farmers through county agricultural agents. Cooperators are chosen by the county auditors in two counties, and in one county each this service is performed by a district home demonstration agent, a Smith-Hughes instructor, and a railway agricultural agent. In the other counties applicants deal directly with the station.

Preparations are now being made to send out about 200,000 trees of hardwood species to 300 farmers for planting new demonstration shelter belts in the spring of 1931. About 15,000 coniferous transplants also will be ready to be shipped next spring for making additions to established shelter-belt plantings.

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Nine additional seats of blister-rust infection were discovered in the western white pine belt of northern Idaho during the summer of 1930. Most of the newly discovered infections were identified as having originated in 1927; several are believed to date from 1923. Points in northern Idaho at which the rust has been discovered on pine now total 13.

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The grazing of goats on a fenced area of loblolly pine forest belonging to the Camp Manufacturing Co., Franklin, Va., has resulted in the establishment of a dense stand of loblolly pine reproduction free of any intermixture of hardwoods. On a similar adjoining area that has not been grazed red gum and other hardwoods, chiefly unmerchantable, form a fairly complete understory beneath the loblolly pine and stand ready to take possession of the site when the mature timber is cut, excluding the possibility of loblolly pine reproduction.

International Body Will Endeavor to Correlate Forest Research Practices

The permanent committee of the International Union of Forest Research Organizations (formerly the International Union of Forest Experiment Stations) at a meeting held July 15–16 appointed a committee on correlation of silvicultural research practices. At the next meeting of the union, to be held in 1932 in Nancy, France, it is proposed to have methods used in various countries presented with a view to bringing about the use of uniform technique and comparable measurements. This would make it possible to report results of research in standard terms. The members of the committee on correlation are Mark L. Anderson, research officer for Scotland, Great Britain Forestry Commission; Yrjö Ilvessalo, professor of silviculture, Forest Research Institute, Helsinki, Finland; W. Jedlinski, professor of forest management, Superior School of Agriculture and Forestry, Warsaw, Poland; E. Wiedemann, director, Prussian Forest Experiment Station, Eberswalde, Germany; M. Oudin, chief inspector of forests and waters, Nancy, France; N. Kobranoff, Forest Research Institute, Leningrad, Union of Socialist Soviet Republics; E. N. Munns, Chief, Division of Silvics, United States Forest Service; and H. Petterson, director, section of silviculture, Swedish Forest Experiment Institute.

Pan-American Agriculturists Meet to Plan Cooperation

In fulfillment of a resolution approved by the Sixth International Conference of American Republics, held at Habana in 1928, an Inter-American Conference on Agriculture, Forestry, and Animal Industry was held September 6–20, 1930, in Washington, D. C. The governing board of the Pan American Union were hosts to the conference. Sixteen of the twenty-one countries making up the membership of the union were represented by 55 official delegates and by about 175 consulting experts.

The purpose of the meeting was to pave the way for inter-American cooperation in meeting problems in its field. The conference aimed first to define outstanding problems which seem to invite cooperative treatment, then to discuss policies and methods for dealing cooperatively with these problems. The topics discussed fell into four main groups: Research in agriculture and forestry, agricultural economics, plant and animal diseases and pests, and commodity production. Forestry was the chief subject of discussion during the sessions of the second and third days.

The governing board of the Pan American Union intends to sponsor a series of inter-American conferences of this nature. One of the resolutions of the 1930 conference calls for a second conference within five years, and another suggests that before the next international conference a national congress on agricult forestry, and animal industry be held in each mem country.

It was resolved that governmental and private ag cultural agencies throughout the Americas send to division of agricultural cooperation, Pan Americ Union, all available bibliographical data on agricultu forestry, and animal industry, thus enabling t division to compile a continental bibliography a special bibliographies on these subjects. The co ference expressed a desire that the activities of t division of agricultural cooperation be extended include the assembling of statistical material, and th with the division as intermediary an exchange of pu lications be arranged among scientific institutions the Americas dealing with agriculture, forestry, a animal industry. It was requested that the Pan Ame ican Union use its influence to unite Latin Americ scientific workers in an association similar to the Ame ican Association for the Advancement of Science.

In resolutions dealing solely with forestry the co ference recommended that the countries of the Amer can Continent undertake forest surveys to determi the location and area of forests, classifying the according to species, merchantable volume by specie productive capacity of each forest type, and rate depletion; that studies be made of the characteristi and ecological behavior of the various species of fore trees and of the various types of forests in all the Lati American countries; that the attention of the variou governments represented in the Pan American Unio be called to the advantages of performing fore exploitation in a rational manner, and of giving speci attention to reforestation needs and to protectio against erosion and floods; that countries not havin already done so take steps to prevent destruction forests through exploitation of secondary product that each country investigate the technical propertie and methods of utilization of all species occurring i its forests in commercial quantities; that plans b formulated under the general guidance of the Pa American Union or by a special international committe for systematic testing of American woods; and tha countries having carried out experiments in the utilization of waste matter resulting from forest exploitatio communicate the results to other countries of th continent. It recommended that efforts be made t standardize the forestry terminology of the America Continent, and that the nations of Latin Americ introduce the teaching of forestry into their programs o agricultural education and even of normal, secondary and primary education, as a means of bringing about the conservation of forests. The matter of establishing institutes for forest research was commended to the governments of the member nations for study.

For the future the name of the conference has been shortened to Inter-American Conference on Agriculture, on the basis that agriculture includes both forestry and animal industry.

rly Observations on Soil Wastage in Mississippi

By J. D. Sinclair, United States Forest Service

There is a general impression that most of the deep lies in the uplands of Mississippi date from the iod of land abandonment following the Civil War. ne of the few remaining old settlers in their tales of ebellum days refer to the cleared lands as being irely in cotton or corn and cultivated with slave or until they resembled large gardens. A Prelim- ry Report on the Geology and Agriculture of the te of Mississippi, by State Geologist L. Harper, blished in 1857, indicates that even at that date soil sion was a problem of no small proportions. Some erpts from Doctor Harper's report are as follows:

intend, by no means, to indicate that our agricul- e does not provide for our wants. It does much re than that. Our Indian corn, our wheat, our ur, is exported to all parts of the world, and our ton clothes the whole civilized world; but we gain ose articles *too much at the expense of our soil, not of labor and industry.* Our agriculture is not a correct, natural, and scientific one. We exhaust our lands, andon them, and resort to others; we remedy, by abundance of our lands, what we ought to prevent our skill and science, and, after a longer continua- n of such an agriculture, our States must be ex- usted, and their inhabitants reduced to poverty.

The territory of the carboniferous formation, the stern portion of Tishomingo County, is generally ly, too much so for agriculture; it has a great deal poor sandy land, entirely formed from the sand ata of the orange sand group, which overlie it nearly erywhere, and in most places very thickly. The owth of forest trees of these lands consists principally pine trees (*Pinus rigida*), and black jack (*Quercus nigra*), as soon as the timber is cut down, the soil is washed off from the slopes of the hills, and the land becomes very poor.

The eocene rocks can be divided into a cretaceous and an aluminous group; the aluminous group consists mostly of most excellent marl beds, which can not fail to have the most salutary influence upon the agriculture of the State.

This agriculture has hitherto been a very exhausting one. Mississippi is a new State; it dates its existence only from the year 1818; and notwithstanding all its fertility, a large part of the land is already exhausted; the State is full of old deserted fields. It is, then, a most fortunate circumstance, that nature has so kindly provided for the refertilization of those exhausted fields, and that the highest authorities of the State made such careful and prudent arrangements to open those resources at once.

The loess, or bluff formation, forms a most excellent soil; decidedly one of the most fertile in the State; its territory was, therefore, selected for the first settlements in the State. But it is remarkable, *a careless and unnatural agriculture has so completely worn out a part of this fertile soil, that it does no more effervesce with acids;* the continual cultivation in cotton has exhausted the lime nearly completely. Fresh soil, of the same field, where it had not been cultivated on account of declivity, and of another place, which had been worn out, were tested; the first effervesced strongly, the latter not at all.

* * *

L. W. Baldwin, president of the Missouri-Pacific Railroad, who is chairman of the Missouri Drought Relief Committee, has suggested to railroad executives the desirability of making purchases of railroad ties during the next few months, to fill prospective needs, as a measure for the relief of farmers.

Foreign Notes

orest Research Program Under Way in British Columbia

British Columbia's Forest Research Division, organ- ed since the war, now has silvicultural studies in ogress at two forest experiment stations and is eveloping a third station for nursery and planting periments. Its Douglas fir studies center in a sta- on at Cowichan Lake, on the southern portion of ancouver Island, consisting of about 400 acres of rested land and three permanent buildings. A good ariety of forest types can be reached from this station an hour's time or less. In the surrounding district gging has been going on for more than 30 years. tudies of spruce regeneration, supplemented by ex- erimental cuttings, are being conducted at a station t Aleza Lake, where permanent headquarters and sidence buildings have been completed. For nursery and planting experiments the division has chosen 600 acres of cut-over land, on a very good fir-hemlock-spruce site, along the highway between Vancouver and Seattle. The nursery is to occupy about 20 acres near the center of this block, and will be surrounded with experimental and demonstration plantings. At present it contains about 140 beds of 1 and 2 year old stock. A 40-acre planting of fir and spruce was made in the spring of 1930. In about five years' time the division expects to be planting 2,000,000 trees annually.

The division's permanent staff, which is headed by P. M. Barr, consists of seven technical men and a foreman.

* * *

The Quebec government has offered to accept half the usual stumpage dues for burned timber cut before March 31, 1931. The object is to reduce unemployment in woods operations.

Canadian Pulp and Paper Production in 1929

Canada's pulp and paper manufacturing industry, which leads all others in the Dominion both as to value of product and as to wages and salaries distributed, again increased its output in 1929. In that year Canadian mills produced 4,021,229 tons of wood pulp, valued at $129,033,154. In 1928 they had produced 3,608,045 tons valued at $121,184,214. Paper produced during the year totaled 3,197,149 tons and was valued at $193,193,022, an increase of 12.2 per cent in quantity and 4.8 per cent in value. The net value of production of the pulp and paper mills increased by more than $2,500,000 to total $147,096,012. The value of pulpwood and pulp exported and the gross value of paper products amounted to $249,227,136, an increase of 1.6 per cent over 1928. Employees in pulp and paper mills in 1929 numbered 33,584, and the total pay roll was $50,214,445. There were 108 pulp and paper mills in operation during the year, of which 34 made pulp only, 28 made paper only, and 46 made both pulp and paper.

Newsprint made up 85.2 per cent of the total reported tonnage of paper manufactured, amounting to 2,725,331 tons valued at $150,800,157. This was an increase over the preceding year of 12.9 per cent in tonnage and 4.6 per cent in value.

The apparent total production of pulpwood in 1929 was 6,573,417 cords valued at $76,415,876. About 80.3 per cent of this wood was manufactured into pulp in Canadian mills.

Exports of wood pulp from Canada during 1929 amounted to 835,710 tons valued at $43,577,021, as compared with 863,805 tons, valued at $45,614,823, in 1928. Exports of paper and paper goods were valued at $154,710,085, as compared with $147,156,792 in 1928. They included 2,510,633 tons of newsprint valued at $148,710,085.

Canadians Experiment in Girdling Hardwoods to Release Conifers

A study of the effect of girdling hardwoods to release conifers has been begun at the Lake Edward Forest Experiment Station, Quebec, in a stand composed largely of mature maple and birch with an understory of young spruce and balsam fir. The girdling was done in 1922. On one 1-acre plot (B) 40 per cent of the mature hardwoods were girdled; on another (C), all the mature hardwoods were girdled. A control plot (A) of one-half acre was established. Reporting on an examination made in 1928 W. M. Robertson states in the June, 1930, Forestry Chronicle that in the first six years after the girdling the net increment of the conifers was 121 cubic feet on plot A, 156 cubic feet on plot B, and 170 cubic feet on plot C. The annual increment during that period averaged 4.2 per cent plot A, 5.6 per cent on plot B, and 5.2 per cent on plot

Eberswalde Forest School Celebrates Centenary

The Eberswalde Forest School, in Prussia, Germa celebrated this year its hundredth anniversary. Th days of meetings and festivities, beginning August were attended by 350 or more German foresters a by representatives from Sweden, Finland, Hunga and the United States. Prof. R. R. Fenska, of New York State College of Forestry, was present a describes an exceptionally felicitous occasion. T speakers accorded special recognition to Profes Schwappach and to the late Professor Wiebe remembered for his pioneer work in developing t seed extraction technique. A part of the exercises w the dedication of a new forest products and soil scie building completely equipped for research in th subjects. Another feature was a trip to near- forests. An excellent male choir of 50 furnished mus There was a banquet with no after-dinner speeches, play, and a grand ball.

Turpentining in the Dutch East Indi

The faces chipped on Pinus merkusii in the nav stores operations of the Netherland East India Gover ment are about 4 inches wide and about 1 inch dee according to information received from Coert du Bo American consul general at Batavia, who was former a member of the United States Forest Service. Tre 12½ to 19 inches in diameter are tapped on 1 fac larger trees up to 25 inches in diameter, on 2 face and those still larger, on 3 faces. The faces are r opened every three days with a wide, shallow ca penter's gouge chisel. In 1927, a year during whi the diversion of labor to building work reduced t normal yield, 574,351 pounds of resin was obtaine from which was refined 412,965 pounds of rosin a 112,721 pounds of turpentine. The yield of cru resin per acre was about 145 pounds.

The Government's naval-stores industry centers Baleq, Central Atjeh, a mountainous and isolate region.

* * *

Later information received through the Unite States Department of Commerce in regard to a 4,00 acre forest planting project undertaken by a Sout African company, mention of which was made on pag 23 of the May, 1930, Forest Worker, is to the effec that although it was first planned to use one of th podocarps in this planting the final decision was to us Pinus insignis. The name of the company is th Afforestation Investment (South Africa) (Ltd.) registered at Pretoria.

A Finnish Study of Pine Roots

esults of a morphological study of the root system he Scotch pine, carried out in south Finland, were orted last year by Erkki Laitakari in Acta Forestalia nica. Sites were classified on the basis of Cajan- s system of forest types. The material investigated sisted of 162 pines, 25 spruce, 4 birch, and 8 aspen; omplete root systems were dug out and investigated.

was found that the direction of the prevailing ds in summer influences the direction of growth of horizontal root system, in that the roots avoid quarter of the prevailing wind and develop more ndantly in the direction whence winds blow with t frequency. Horizontal roots of pine were found e longest on sandy heaths, clay soils, and moraine ravel poor in stones, in the order named. Where es were abundant in the moraine or gravel soils the ts remained short. Rich peat does not favor long ts, it appeared, but poor, wet peat does. Extent oot systems shows the same correlation to soil as gth of roots. The root systems of all trees examined ended far beyond the range of the crowns.

t was found that outer vertical root systems develop, a rule, where old stumps occur. On clayey and ty soils the taproot and the vertical root system e absent, being replaced by a well developed, dense izontal system round the base of the stem.

n no case did the volume of the roots exceed that the stem. Considerable variation was found in the io between stem and root volume. Large trees had nparatively smaller volumes of root than small es. The roots were proportionally smaller in dense ods than in open stands.

Intergrowth of roots seemed to occur frequently, especially near the bases of trees. As a result of this it seems that dead or felled trees may, through their roots, be of use to living trees. It was observed that the roots preferred to grow along channels of decaying or already decayed old roots. These observations point to the conclusion that a first crop of trees on a poor site may considerably assist a subsequent crop.

Examination of spruce roots indicated that the root system of spruce exceeds that of pines in total length and area. The depth of the horizontal root system of spruce was found to be considerably less. The root system of birch seemed to resemble that of pine in extent and depth.

* * *

School children of Dauphin, Manitoba, collected 3,058 pounds of maple seed this year to be used in raising trees for planting on farms in the Prairie Provinces. The seed were turned over to Supervisor Smith of the Riding Mountain Forest to be sent to the forest nursery station at Indian Head, Saskatchewan.

* * *

Canada's forest products laboratories now employ 90 or more persons, of whom more than 30 are university graduates with scientific training. Seventeen years after the beginning of its forest-products research work, in Montreal, the Dominion forest service now has a main laboratory at Ottawa, a branch laboratory at Vancouver, and a pulp and paper laboratory in Montreal.

Personals

Sir John Russell, director of the Rothamsted Experi- ntal Station, England, has been elected president the International Congress of Soils. It is proposed hold the next meeting of the congress in 1935 at mbridge, England, and to follow the plenary ses- ns with a soils tour of the Mediterranean countries, cluding Spain, Algiers, Egypt, Palestine, Greece, aly, and France.

Arthur Ringland has been appointed to a position the agricultural foreign service now being organized the United States Bureau of Agricultural Eco- omics under provision of a recent act of Congress. erlin has tentatively been chosen as his headquarters. he purpose in creating this position is to keep the epartment of Agriculture in touch with European evelopments in the field of forestry as an aid in the evelopment of American forestry. Particular atten- on will be given to land use in relation to forestry. The Forest Service will be responsible for the technical direction of the work. Prior to the war Mr. Ringland was connected with the Forest Service for many years, during seven of which he was district forester in the Southwest. Following service in France with the Tenth Engineers (Forestry) and in Belgium with the Thirty-seventh Division, he examined war damage to French forests for the American Peace Commission. He was then assigned to the American Relief Administration, serving as chief of mission in Czechoslovakia for two years and in Constantinople for one and one-half years. Recently he has served as executive secretary of the National Conference on Outdoor Recreation and as member and secretary of the President's Coordinating Committee on National Park and Forest Boundaries, a Federal committee on the conservation of the elk of Jackson Hole, Wyo., and the President's Yellowstone National Park Boundary Commission.

Ernest Henry Wilson, keeper of the Arnold Arboretum of Harvard University, was killed in a motor accident in Worcester on October 1.

Robert Y. Stuart, Chief of the United States Forest Service, and Earle H. Clapp, Mr. Stuart's assistant in charge of the branch of research, have been elected fellows of the Society of American Foresters. Jean J. Jagerschmidt, of Paris, France, has been made a corresponding member of the society. Aimo Kaarlo Cajander, of Finland, and Robert Scott Troup, of Oxford University, have been made honorary members.

Mrs. William Boyce Thompson has been elected chairman of the board of directors of the Boyce Thompson Institute for Plant Research, Yonkers, N. Y., filling the vacancy left by the death of her husband, who founded the institute and endowed it during his lifetime to the extent of $10,000,000. The other members of the board are: Charles F. Ayer, Raymond F. Bacon, William Crocker, Caleb C. Dula, Frederick H. Ecker, Robert A. Harper, Lewis R. Jones, Thomas La Mont, Fred J. Pope, and Margaret Thompson Schulze.

George A. Duthie has been appointed chief of the division of information in the Washington, D. C., office of the United States Forest Service, succeeding Ward Shepard. Mr. Duthie entered the Forest Service immediately after he received the master's degree in forestry from the University of Michigan, in 1909, and has been connected with the service continuously. He was for 17 years a forest supervisor, serving in that capacity on the Medicine Bow, Harney, and Black Hills National Forests. In his new position he has charge of informational and educational activities.

W. W. Ashe has been appointed chairman of the tree names committee of the United States Forest Service. The other members of the committee are W. A. Dayton, Perkins Coville, Arthur Koehler, and W. D. Brush. The duty of this committee is to gather evidence as to the propriety, validity, and use of common names of trees and to make recommendations to the Forester as to retaining, changing, or originating such names.

George E. Vincent, until recently president of the Rockefeller Foundation, has assumed the presidency of the Izaak Walton League.

Officers elected by the Association of State Foresters for the coming year are president, E. O. Siecke; vice president, Ben E. Bush; and secretary-treasurer, Ralph F. Wilcox. Frederick Dunlap and J. H. Foster have been elected members of the executive committee.

Edgar T. Wherry, in charge of the crop chemistry laboratory of the United States Bureau of Chemistry and Soils, has resigned to accept the position of associate professor of plant ecology in the department of botany, University of Pennsylvania.

George Stewart, head of the agronomy departmen
the Utah Agricultural College and agronomist of
State's agricultural experiment station, has accep
appointment as senior forest ecologist, Intermoun
Forest and Range Experiment Station, Ogden, U
Since his graduation from the Utah State Agricultu
College in 1913 Doctor Stewart has been engaged
research, graduate study, and teaching, dealing larg
with agronomic problems of dry land and irrigat
farming. He received the M. S. degree from Cor
University in 1917 and the Ph. D. degree from
University of Minnesota in 1926. His occupancy
the position which he now leaves dates from 19
He is the author of a textbook on alfalfa growing a
of many bulletins and papers, one of the bullet
dealing with the subject This Public Domain of Ou
At the forest experiment station he will have cha
of a study of spring-fall and winter range.

Francis X. Schumacher has resigned from the f
estry faculty of the University of California to beco
chief of the section of forest measurements in t
Washington, D. C., office of the United States For
Service. Mr. Schumacher is a forestry graduate
the University of Michigan, and before going to
California post had experience on national forests
the intermountain region. He has published a nu
ber of bulletins, the latest of which is Yield, Stand, a
Volume Tables for Douglas Fir in California. V.
Clements, whom Mr. Schumacher succeeds, has be
assigned to the California Forest Experiment Station.

John R. Curry, assistant State forester of Marylan
has accepted appointment as associate silviculturist
the California Forest Experiment Station, where
will engage in forest fire research. Walter J. Quic
Maryland district forester with headquarters
Upper Marlboro, succeeds Mr. Curry as assista
State forester. C. F. Winslow, district forester
Pikeville, Tenn., succeeds Mr. Quick.

B. F. Heintzleman, assistant regional forester
Alaska, has spent several months in Washington, D. C
this fall working out the final arrangements for tw
large paper-making developments on the Tonga
National Forest, Alaska, based on timber sales awarde
in 1927. Each of these sales involves 5,000,000,00
board feet of timber. The way will be cleared for th
two paper companies to which the sales were awarde
to begin building paper mills, at Ketchikan and Junea
immediately upon receipt of the necessary water-pow
permits, applications for which are now pending.
claimant to land on one of the power sites involved ha
sought to enjoin the Federal Power Commission fro
issuing a license, and the hearing on this suit before th
Supreme Court of the District of Columbia has cause
some delay in completing negotiations. In the negotia
tions with the paper companies Mr. Heintzlema
represents the Federal Power Commission as well a
the Forest Service.

eorge E. Mushbach, game protector of the United tes Bureau of Biological Survey, has been appointed erintendent of the Bear River Migratory Bird uge, Utah. This appointment fills the vacancy ted when David H. Madsen resigned to become a d purchaser in the National Park Service. Mr. Mush- h's headquarters are at Ogden, Utah.

. B. Locke, for some years a technical assistant in the e of lands of the Ogden, Utah, headquarters of the ted States Forest Service, has been appointed ciate biologist in the Bureau of Biological Survey assigned to the Intermountain Forest Experiment tion. Mr. Locke is a graduate of the University Maine and holds the M. F. degree from the Yale ool of Forestry. He has for some time been en- ed in a study of the deer situation on the Kaibab ional Forest. His first assignment in his new posi- will be a study of the rôle of rodents in erosion, ough he will continue studies in game management.

osef N. Knull has been appointed senior research omologist at the Pennsylvania Research Institute, nt Alto, Pa. Mr. Knull received the B. S. degree n the Pennsylvania State College in 1915 and a mas- s degree from the Ohio State University in 1924. has had several years' experience in entomological k in Pennsylvania.

harles K. McHarg, jr., has been transferred from supervisorship of the Coeur d'Alene National For- , Idaho, to take charge of the cooperative work of United States Forest Service in north Idaho and t Washington under the Clarke-McNary Act. His dquarters are at Coeur d'Alene, Idaho. C. D. ipson has been transferred from the supervisorship the Lolo National Forest, Mont., to succeed Mr. Harg, and has been succeeded by Theodore Shoe- ker, heretofore assistant regional forester in charge public relations in district 1.

A. G. Nord has been appointed to the supervisorship the Wasatch National Forest, Utah, which was left ant in July by the death of E. C. Shepard. Mr. rd was made supervisor of the Ashley National For- , Utah, in 1925. His successor in that position is nes O. Stewart, who has been connected with the den, Utah, office of the Forest Service as inspector grazing.

John Glover Weir has been appointed extension for- er for Vermont. Mr. Weir received the B. S. degree forestry from Cornell University in 1927 and has ved as an assistant district forester in Quebec. s headquarters are at the University of Vermont, rlington, Vt.

L. I. Barrett has been transferred from the Central ates Forest Experiment Station to the Appalachian rest Experiment Station, where he will engage in owth studies.

K. D. Doak has been appointed in the Office of Forest Pathology, United States Bureau of Plant Industry, to study mycorrhiza. He will have headquarters at the Allegheny Forest Experiment Station, Philadelphia. Mr. Doak is a graduate of Purdue University, where he majored in pathology and completed most of the work required for the doctor's degree. He has published results of research on the cereal rusts, on a phanerogamic parasite on roots, and on mycorrhiza. A. B. Hatch, of the United States Forest Service, who has returned to the Allegheny station after a period of study in Sweden, will also be working on aspects of the mycorrhiza problem.

George L. Drake, since 1919 assistant in the office of forest management at the Portland, Oreg., headquarters of the United States Forest Service, has resigned to become assistant to the president of the Simpson Logging Co., Shelton, Wash. Mr. Drake, who is a graduate of the Pennsylvania State Forest School, has been connected with the Forest Service since 1910.

Roy E. Miller has been placed in charge of press relations of the Washington, D. C., office of the United States Forest Service. Mr. Miller is a graduate of the University of Missouri and has had journalistic experience in Missouri and California. He comes to his Forest Service position from that of city editor of the Colton (Calif.) Daily Courier.

Vernon E. Young has been appointed to the department of forest botany, New York State College of Forestry, to succeed Don Marion Benedict. Doctor Young received the B. S. degree from the Utah State College in 1922, the M. S. degree from the Iowa State College in 1924, and the Ph. D. degree from the University of Minnesota in 1929. He has made extensive ecological studies dealing with desert and mountain vegetation.

William J. Baker has been made head of the department of lumber manufacture in the school of forestry, Oregon State College. Mr. Baker received two forestry degrees from the college and has had several years' experience as timber inspector for the Southern Pacific Co., grader for the West Coast Grading Bureau, and dry-kiln superintendent for the Pacific Spruce Corporation, Toledo, Oreg.

A. M. Sowder, for the past three years Idaho extension forester, resigned September 1 to accept a position as assistant professor of forestry in the school of forestry of the University of Idaho. He will teach forest engineering, farm forestry, logging, and lumbering. Otto C. F. Krueger, a 1929 graduate of the Idaho School of Forestry, has resigned as a junior forester on the Gunnison National Forest, Colo., to succeed Mr. Sowder.

A. D. Folweiler, district forester at New Bern, N. C., has resigned to take up graduate work at the Yale School of Forestry.

L. G. Hornby, supervisor of the Flathead National Forest, Mont., has accepted a permanent assignment in the regional office of the Forest Service at Missoula, Mont., for the purpose of studying transportation problems with reference to fire control. Supervisor Kenneth Wolfe is to be transferred from the Selway National Forest, Idaho, to the Flathead. Supervisor James F. Brooks will be transferred from the Missoula National Forest, Mont., to the Selway.

John C. Kuhns, supervisor of the Whitman National Forest, Oreg., has been chosen to represent the United States Forest Service this winter as lecturer in the forest schools. Beginning about January 12, Mr. Kuhns will visit 13 schools, at each of which he will give three or four lectures on subjects relating to the work of the Forest Service and will confer with individual students.

Eitel Bauer, forester of the Cason J. Calloway Co., La Grange, Ga., has been added to the list of those to whom the Charles Lathrop Pack Forest Education Board has awarded forestry fellowships effective this year. Mr. Bauer will study silviculture and forest management at the Harvard Forest. Raymond H. Rogers, in charge of the Iroquois Forest of F. Ambrose Clarke, Cooperstown, N. Y., receives the eighth fellowship awarded by the board this year, and will make an economic study in the region centered about Cooperstown under direction of the New York State College of Forestry.

Henry Bull, of the Connecticut Agricultural periment Station, and Robert K. Winters, of Central States Forest Experiment Station, have b appointed assistant silviculturists at the South Forest Experiment Station for work on southern ha woods. Junior foresters recently added to the s of this station are J. W. Cruikshank, a forestry gra ate of Cornell, and Ralph C. Unger, of Syracuse, the forest survey in the southern hardwoods; Fr Heyward, jr., of the University of California, Carl F. Olsen, of Cornell, for naval stores work Starke, Fla.; and R. R. Reynolds, of the Univers of Michigan, for economic studies.

Clyde S. Webb has been appointed supervisor of Kootenai National Forest, Mont., filling the vaca caused by the transfer of Supervisor Frank J. Jeffer to the Forest Service regional office at Missoula. Webb has had charge of field supervision of tim sales in region 1.

Kenneth C. McCannel, Lloyd T. Webster, and J Liersch are the recipients of the Anderson fellowsh at the University of Washington College of Fores for the year 1930–31. Mr. McCannel was gradua from the school with the bachelor's degree in 1926 a since then has been continuously in the employ of British Columbia Forest Branch. Mr. Webster i member of the class graduated from the school in 19 Mr. Liersch is a 1927 graduate of the University British Columbia and has had experience with British Columbia Forest Branch.

Bibliography

Lodgepole Pine Seed Study Serves Double Purpose

By D. S. Olson, United States Forest Service

An exceedingly helpful publication is the recent bulletin by C. G. Bates on The Production, Extraction, and Germination of Lodgepole Pine Seed.[1] Aside from its thorough treatment of the subject denoted in the title, this bulletin serves an even greater purpose at this time by showing research methods for similar studies of other timber species. After reading it a forester can not be content without a complete set of such studies covering the important timber species of the country.

Results are given of what was perhaps the first serious attempt in America to measure the seed production of a timber stand over a period of years. T study was based on plots on the Medicine Bow N tional Forest, in southern Wyoming, and the Gunnis National Forest, in western Colorado, representi two climatic races of the species. Comparisons, as quantity and quality, are made of the seed produc in each of 10 years on the two groups of plots; co parisons are made, also, of seed produced by differe crown classes. One of the outstanding peculiarit of the lodgepole cone is its resistance to heat and retention of the seed for three or four years af maturity. This peculiarity is a great aid to t natural reproduction of the lodgepole pine. F may dry and open the old cones on lodgepole pi trees and thus release the accumulated supply of se to the ground, even while killing the trees themsel and all other seed of forest trees. Figures are giv as to quantity and quality of seed collected from c as well as from new cones.

The author refutes the belief, common among fo esters, that abundant cone crops are borne at regul e or four year intervals. Records of minimum peratures during the flowering period of the lodge- pine and Douglas fir and records of cone crops of e species indicate a direct relation between low temtures, with the consequent freezing of pistillate flowand cone-crop failures. The occurrence of bumper s can therefore be no more regular than the occure of seasons favorable for the development of the ers, is the author's contention. Now more diffi- than ever becomes the explanation of another nmon belief" that good cone crop years coincide most species (and likewise years of crop failure), though the pines require two growing seasons nature their cones and the other conifers require one.

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[1] U. S. Department of Agriculture Technical Bulletin No. 191. Copies will be furnished free of charge, as long as the supply lasts, by the Office of Information, U. S. Department of Agriculture, Washington, D. C., and are for sale by the Superintendent of Documents, Washington, D. C., at 20 cents each.

uch has been written about seed extraction, but bulletin goes vastly farther into the principles of drying. The action of heat alone does not ce to cause the opening of cones. The essentials ny cone-drying kiln are a steady supply of hot, air; natural circulation of the hot air, which will readily through successive layers of cones; pron for arranging the cones in a single layer on each and for moving the trays downward, since the est tray always receives the most heat; provision frequent shaking of the trays to cause loose seed ift to the floor or a receptacle of lower temperature; proper insulation to reduce heat waste by radiation. dvantages and disadvantages of air drying of epole pine cones as a preliminary to kiln drying discussed.

he third part of the bulletin deals with methods naking germination tests that are applicable to ny conifers.

model seed-extracting plant for lodgepole pine es is described and illustrated in an appendix.

n American Study on Silvicultural Control of Wood Quality

By R. T. Fisher, Harvard Forest

Benson H. Paul's report on The Application of Sillture in Controlling the Specific Gravity of Wood [2] bodies the results of the first considerable research its kind in the United States. It indicates the nciples which silviculture must apply if it is to duce the quality of product and hence the value ich profitable forestry will demand.

fter summarizing the results of previous European rk on silvicultural control of wood properties Mr. ul gives figures based on strength tests to show t specific gravity is a reliable criterion of the quality wood. The body of the study deals with the determation of the specific gravity of wood samples from ected individual trees of a number of species, the specimens of each species having been collected from various geographical sources and from stands varying in life history, especially with regard to density of stocking. The species used among the hardwoods were white ash, pignut and shagbark hickory, rock elm, sugar maple, and yellow poplar; among the conifers, loblolly, shortleaf, slash, and longleaf pine and second-growth redwood. The details of the tests are most interesting and conclusive. In brief it was shown that high specific gravity (or high quality of wood) is produced in the hardwoods by an early density sufficient to prune the boles, thinning to maintain a high rate of growth, and favorable soil conditions. In the conifers the relief of overdensity is likewise necessary to prevent unduly slow growth, but under certain conditions thinning results in lower specific gravity and hence in reduced strength. In short, "the regulation of growing space is the silvicultural tool which the forester can use most easily in controlling the specific gravity of wood." This conclusion is particularly significant as a complement to the facts, previously known, that the number and size of knots may be reduced by controlling density and the association of species, and that hardwoods in general and certain groups of species in particular are definitely soil-improving.

Every forester who has the opportunity or the hope of practicing silviculture will hail this bulletin as a real contribution to the technique of his trade.

Chestnut Blight

By R. M. Evans, United States Forest Service

A bulletin on Chestnut Blight [3] by G. F. Gravatt and L. S. Gill is one of the latest additions to an already considerable literature on this subject. It presents, briefly and clearly, information concerning the origin, spread, distribution, symptoms, and character of the disease, its effect on the merchantability of the wood, uses of blight-killed chestnut timber, and efforts being made to develop blight-resistant strains and to introduce blight-resistant species. Illustrations as well as text bring out the symptoms of the disease and the appearance of the cankers so clearly that there should be no difficulty in identification. All who are interested in this subject, seriously affecting the timber management of such a vast area, will welcome the bulletin as an up-to-date résumé of conditions.

It has been estimated that chestnut forms 25 per cent of the stand on some 33,000,000 acres of forest land in the southern Appalachians. Making use of the values of this material before they are destroyed constitutes a salvage job of major importance. The blight fungus appears to have no effect on the mechani-

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U. S. Department of Agriculture Technical Bulletin No. 168. For by the Superintendent of Documents, Washington, D. C., at 15 ts a copy.

[3] U. S. Department of Agriculture Farmers' Bulletin No. 1641. For sale by the Superintendent of Documents, Washington, D. C., at 10 cents a copy.

cal strength of the timber, and the utilization value of blight-killed chestnut should be no less than that of trees girdled with an ax and left standing. In this connection it is encouraging to note that the National Committee on Wood Utilization has interested itself in promoting the use of chestnut poles. The authors' statement that "sawed chestnut lumber is much in demand, but increased cutting * * * tends to glut the market" appears to be very moderate. One has only to walk through a few mill yards and talk a little with the owners to discover how hard it is to dispose of accumulated stocks.

Not much hope is held out for the future of this valuable tree. It is explained that the blight has now spread to nearly all parts of the native chestnut range. Isolated trees and groups as far west as Michigan are affected. It is expected that the entire present stand will be destroyed. However, chestnut possesses a remarkable capacity for producing generation after generation of sprouts, and in the regions where blight has been present the longest some of these sprouts have now grown large enough to produce viable nuts. "It is reasonable to expect," the authors conclude, "that by selection among the seedlings growing from nuts of the sprouts a quick-fruiting, moderately resistant strain of the American chestnut will finally be evolved."

Ill Directed Forest Use

By F. H. Eyre, United States Forest Service

Much has been written about forest devastation by lumbering, insects, and disease, to say nothing of fire, and of damage to forests by animals that graze and trample; but little has been said of what forests suffer from the trampling foot of the public. A paper by E. P. Meinecke entitled "A Report Upon the Effect of Excessive Tourist Travel on the California Redwood Parks," published by the California Department of Natural Resources in 1928, cites a number of cases in which decidedly too many human feet have been set on the forest floor. Doctor Meinecke, who is a pathologist in the Office of Forest Pathology, Bureau of Plant Industry, says that the fundamental object of the withdrawal of redwood groves is to preserve them for the enjoyment of present and future generations of Americans. "If the redwoods were merely saved from the ax to fall victims to the slow but fatal change in their living conditions brought about by excessive tourist travel, the main purpose of creating the parks would certainly fail."

The author first compares conditions in the redwood groves with city park conditions. He points out that old forest trees are unlike those in city parks, which are relatively young, have been planted and cultivated by man, and can be quickly replaced in case of death. Park trees have adjusted themselves to an environment far different from that of the forest. The forest association is made up of "a wild population of which have attained old age as a result of a highly plex competition with each other and the many o plants. * * *."

"It is well known that plants grown old in the state do not take kindly to contact with civilization even the redwoods, although their hardiness is atte by their great age. Investigation of condition several groves disclosed the fact that the tramplin many thousands of tourists has severely injured m of the redwoods, has killed some associated spe such as Douglas fir and tanbark oak, and over l areas has entirely destroyed the lower vegetatio ferns and flowering plants. The heavy travel compacted the soil surface into a tough, leathery l which neither air nor water can penetrate. Where this soil compacting has occurred the feeding roots of trees, which are always close to the surface, have b killed in large numbers, and where not killed have b rendered incapable of functioning properly. Nat conditions have thus been completely altered. T can not be restored, but there is hope for some impro ment.

To improve growing conditions for the redwoods controlling the public is by no means a simple ta The erection of fences or other artificial barriers is v objectionable. Even signs would detract from natural beauty of the groves. In sizing up the pr lem and determining what is to be done about Doctor Meinecke shows a keen appreciation of habits of the tourist public. He says that "man g preferably where others have gone before. He car in what others before him have found desirable car ing ground. * * * The average tourist, com from city or town, neither feels perfectly at home the forest nor is inclined to exert himself unduly. follows the beaten path and therefore the easiest pat With these traits of the tourist in mind the aut recommends that the concentration of travel be co teracted first by removal of all buildings from forest, with provision for camping and car parking parts of the groves other than those which contain largest trees. Then by properly placing natural stacles such as logs and heavy limbs, and by laying trails so that they go through thick undergrow public travel can be confined to restricted lan Finally by loosening the soil through careful culti tion it is hoped that favorable soil conditions can restored in part on severely trampled areas.

It seems reasonable to believe that many tree spec in other regions may be no less susceptible to dama by tourist traffic than the redwoods. Meineck findings and recommendations should be of interest all who are charged with the administration of for areas that are used by the public for recreatio especially areas on which it is desired to preser natural conditions.

A Textbook on Silvics

By THURMAN J. STARKER, Oregon State College

r many years teachers of silviculture have strug- along with notes picked up during their own ge days, to which they added from time to time thing extracted from a Forest Service or private ication. This was particularly true of that branch viculture known as silvics, the science which treats e lives of the trees in the forest. Because of the mentary nature of our knowledge of silvics and use some of the silvical data in use were question- it appeared that no one wanted to risk his reputa- by publishing a book on this subject. Publication book entitled "Sylvics"[4] by E. G. Cheyney, pro- r of forestry in the University of Minnesota, efore entitles Professor Cheyney to congratulations e of the pioneers in this field in the United States; I am sure that teachers and students of forestry welcome this addition to the literature of their ect.

his book is in mimeographed form and consists of pages. It is divided into three parts, which are ted, respectively, to factors affecting tree growth, ription of forest regions and types, and a short cal description of each important forest tree of the ed States.

he discussion of pure silvics is very much abbre- ed, taking up only the first 22 pages. Wind, for nple, is given but two short paragraphs, one deal- with the effect on evaporation and the other with effect on the form of the tree. The discussion does cover such relationships as wind and the distribu- of moisture, wind and the distribution of pollen seed, wind and its effect in modifying temperature, d and soil transportation, wind and uprooting and kage, wind resistance of various species, and wind fire. Several other site factors are ignored entirely. s, if criticism were offered, it would be on the basis oo extreme brevity for a college textbook on silvics. at Professor Cheyney has offered in this portion of book is fundamental and "meaty."

n Part II, which occupies 39 pages, the principal st regions are discussed as to topography, types, cies, underbrush, flowering plants, rainfall, and soil. s is in sufficiently brief form to make interesting ding, and represents a great deal of work.

n Part III, the major portion of the book, each of important forest trees of the United States is con- ered as to general range, stand habits, seed produc- n, tolerance, etc. This represents an enormous ntity of work in boiling down material previously lished on these trees. In each case the source of information is given. It is to be regretted that scientific names of the trees mentioned are often spelled.

Burgess-Roseberry Co., Minneapolis, Minn.

Forestry and Forest Fires in Arkansas

By W. R. HINE, Secretary, Society of American Foresters

At last a thorough analysis has been made of the forest problem of Arkansas. The analyst is E. M. Bruner, district forest inspector, United States Forest Service, and the results have been published as Extension Circular No. 281 of the Arkansas Extension Service, under the title "Forestry and Forest Fires in Arkansas."

In this study, to which Mr. Bruner was assigned at the request of Gov. Harvey Parnell, all possible assistance was given by the Arkansas Agricultural Extension Service, the Arkansas State Chamber of Commerce, many other groups interested in Arkansas forests, and a host of local officials. In order to bring up to the minute the information provided by these agencies Mr. Bruner in the fall of 1929 visited every county in the State, studying forest conditions through personal observation and discussion on the ground.

As Mr. Bruner says, the Arkansas of the early pioneer was a veritable forest empire. Forests including splendid stands of both pine and hardwood extended over 32,000,000 acres of the State, practically its whole area. Cutting for lumber, clearing for agriculture, and development of cities and towns have now reduced the old-growth forests to approximately 2,000,000 acres. There is perhaps 5,000,000 acres of thrifty second growth, and 15,000,000 acres of second growth more or less ravaged by fire. On about 2,000,000 acres fire damage has been so severe that reforestation will not take place except by artificial means. Heavy cutting and repeated fires have greatly curtailed the forests' production. The total stand of timber, once perhaps 200,000,000,000 or 300,000,000,000 board feet, has been reduced to about 40,000,000,000 board feet.

Briefly summarized, the Arkansas forest problem is one of approaching exhaustion of the old growth, lack of appreciation of the value of the growing forest, and widespread destruction by forest fires. As Mr. Bruner says, "fires literally run wild in the woods of Arkansas." Each year 10,000 or more fires are intentionally set. From long familiarity with the incendiary problem as it exists in Arkansas and elsewhere in the South Mr. Bruner is able to give an excellent analysis of the reasons behind this fact.

An especially informative section of the report describes the many ways in which fires damage the fire-resistant pines and the hardwoods.

Arkansas forest trees reproduce so quickly, grow so rapidly, and produce such excellent lumber and other forest products that I am inclined to think the possibilities of growing profitable forest crops in Arkansas might have been stated more emphatically in this bulletin. Studies of the Southern Forest Experiment Station of the United States Forest Service, which as Mr. Bruner states have revealed that the shortleaf pine grows faster in south Arkansas than anywhere else in its range, have further shown that on Arkansas areas carefully protected from fire 60 cords of pulpwood per acre has been produced in 30 years and 50,000 board feet of lumber in 50 years. Over considerable areas of the best soils in south Arkansas careful protection and intelligent management will make possible the production of at least 500 board feet of timber per acre per year.

Farmers and other small landowners have a special opportunity to profit by the prevention of forest fires in Arkansas. Of the 20,000,000 acres of privately owned forest land in the State 13,500,000 acres, or 67½ per cent, is included in holdings of less than 1,000 acres. Of this total 5,500,000 acres is owned by farmers. The Federal and State Governments together own about 2,000,000 acres of forest land in the State.

Every county in Arkansas is faced with the forestry problem; not a single county has less than 35 per cent of its area in forest cover of one kind or another, and in every part of the State heavy cutting and fire destruction have had their effect.

Organized cooperation for the prevention and suppression of forest fire is the solution offered by Mr. Bruner. "Forest destruction in Arkansas," he says, "is due primarily to the traditional habit of woods burning. Effective fire prevention requires above everything else that the individual citizen must be brought to realize his personal responsibility in keeping fire out of the woods." The program he suggests would seek through every educational facility available to overcome the lack of information, the prejudice, and the carelessness which are the reasons behind Arkansas forest fires. Next it would provide systematic preparation for effective control and suppression of such fires as do start. Cooperation on the part of the landowners, the State, and the Federal Government is indicated as an essential factor in this program.

Those interested in forestry in Arkansas or in the South will find this bulletin full of interesting facts. It is well illustrated with many photographs of Arkansas forests and forest industries. A feature deserving special mention is a set of graphs by R. P. Holdsworth, formerly professor of forestry at the University of Arkansas.

A Good Forestry Text for Schools

By L. C. EVERARD, Editor, American Association of Museums

Though the subtitle is First Steps in Southern Forest Study, Mrs. D. P. Edgerton's book Southern Forests [5] goes a long way into the subject of what forests are and what they mean to people. An introductory section outlines the contribution of forests to the economic and social progress of the United States. There is also a paragraph on the different forest regions of the country and one on the migratory character of the lumber industry in the past, and several pages on the importance of southern forests. main body of the book is cast in the form of four less one each on the individual tree, the forest as a t community, the products and influences of the for and the forests of the world and their conservati The concluding chapter deals with observances Arbor Day, school collections for forestry study, a field work.

Two pedagogical devices are used with spe effectiveness. One is the lesson problem, which used both to stimulate the pupil's interest and suggest new thought on the material presented in text. The other is the appeal to the eye. The illustrations are well chosen and clearly reproduc With their accompanying legends they are in themsel an introduction to forestry study.

The book provides adequate and authentic stu material, presented in such form as to fit in harmo ously with school curricula of the present day. It in addition a lot of ingenious suggestions for use both and out of the classroom and bears evidence throu out of the author's practical acquaintance with fores teaching in the public schools. Mrs. Edgerton now a then overindulges her liking for metaphor and in so instances such as the section on foreign forests pas along quickly where another might place emphasis, vice versa. As a whole, however, the book is unus both in quality of content and in adaptation for use introducing school children to the study of forestry.

* * *

Paul W. Stickel, of the Northeastern Forest Expe ment Station, has published a translation from German of the paper on Investigations of the S nificance of Tree Mycorrhiza written in 1925 Elias Melin, of Sweden. The translation appears a book of 173 pages lithoprinted by Edwards Br Ann Arbor, Mich.

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FOREST WORKER

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UNITED STATES DEPARTMENT OF AGRICULTURE

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Announcements

Western Forestry and Conservation Association Meeting

The annual meeting and Pacific Coast forest conference of the Western Forestry and Conservation Association will be held in Spokane, Wash., March 19-21, with headquarters in the Davenport Hotel. As usual, the first day will be devoted to affairs of the protection and educational committees. On the second and third days, phases of forest growing and protection will be discussed.

Second Spanish National Congress of Lumber and Lumber Industries

Spain's second National Congress of Lumber and Lumber Industries will be held in Madrid in May, 1931. It will continue the work initiated at the first congress, held in Barcelona in 1929. The organizing committee of the congress includes representatives of the national institute of forest research and many national associations such as those of wood importers, cork producers, and paper manufacturers.

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OREST WORKER

shington, D. C. JANUARY, 1931 Vol. 7, No. 1

State Forestry

w York Acquires 40,000 Acres for Reforestation under Hewitt Act

ithin the year 1930 the New York Conservation rtment acquired more than 40,000 acres of land levelopment as production forests, under provi- of the Hewitt law of 1929. The cost averaged per acre. The land acquired consists of 48 , ranging from 500 acres to more than 3,600 , in 14 counties. All the areas to which title has approved have been planted, the planting requir- more than 7,000,000 trees. Planting costs per trees ranged from $2.05 for trees planted with use of a machine to $7.31 for trees planted by . All the new plantations have been protected st forest fires with fire lines consisting of six ws each. The 45.27 miles of fire line required $22.05 per mile. To protect the plantations of ern white pine from the blister rust, currant and berry bushes were removed from 2,430 acres of in the vicinity of such plantations at a cost of t 50 cents per acre.

the year ending September 30, 1930, New York ged its State forest preserve by 40,142 acres, ding 22,242 acres in the Adirondacks and 17,900 in the Catskills. These lands cost on the aver- 9.33 per acre. The outstanding purchase of the in the Catskills is a tract of more than 2,000 including the so-called Westkill or Deer Notch.

s Few along Cleared Roadsides in California

23 out of 28 California counties reporting, not a e fire occurred in 1930 along roadsides which the division of highways had cleared, State Forester t announces. In the five remaining counties only fires along such roadsides were reported. Along ways that had not been cleared, 89 fires occurred e 28 counties during the year. Under the State's roadside clearing program, highway crews on truction or maintenance work clear away the s, brush, and other débris along roadsides by spraying them with oil and burning them. Before the burning is done the State obtains the consent of owners of roadside property.

Proposed State Forest for California

By I. H. Price, United States Forest Service

An exchange of forest land between the Federal Government and the State of California was recently completed through which the State obtains a consolidated block of 8,973 acres along the western boundary of the Lassen National Forest, in Shasta County. The State gives in exchange a somewhat greater area consisting of scattered school sections within the national forest boundaries.

Since school lands were used to acquire the Shasta County area, the area can not yet be considered strictly a State forest. It is proposed to introduce legislation to pay into the State school funds the amount of the appraised value of the school lands involved in the exchange, and thus make it possible to establish a State forest in the strictest sense of the term. If such legislation is approved the State will have a forest property of a permanent character and one that can be largely extended to the north, west, and south, since the adjacent lands in these directions are all privately owned.

The Shasta County area has been carefully mapped and cruised. It is estimated that there is 100,000,000 feet of merchantable timber on the area. Most of this timber is concentrated on a small portion of the block, thus constituting a perfectly merchantable stand. The remainder of the block is made up chiefly of reproducing brush lands. These brush fields are the result of fires that occurred prior to the period of protection, many of the fires probably antedating the coming of white men to the country. The young growth is coming in very fast on account of the protection given the area during the past 20 years, and much of it is now reaching pole size. With continued protection, the forest should regenerate itself over the entire area without planting.

The merchantable stand consists in a mixture of western yellow pine, sugar pine, incense cedar, and white fir. The young growth that is replacing the brush consists of these same species; but the greater portion of it is white fir, since the brush fields are located principally on areas that most readily produce this species.

New York Equipped to Extract Seed from 10,000 Bushels of Cones a Year

More than 2 tons of tree seed will be used in 1931 in New York State's forest nurseries. When a new unit recently purchased at Willsboro has been added to its seed-extracting plants, however, the State conservation department will be able to fill its own seed requirements almost entirely in years when the cone crop is good. Extraction plants at the State's Lake Clear and Saratoga forest nurseries have a capacity of about 3,000 bushels of cones each, and the one at Willsboro has a capacity of about 4,000 bushels. Operation of the plants at Willsboro, Lake Clear, and Saratoga will cut in half the State's annual seed bill. For 1931 this will be about $12,000.

The Willsboro plant is located in the heart of the northern white pine and Norway pine region.

In years of good cone crops the department can obtain within the boundaries of New York as many cones as it needs of northern white pine, Norway pine, white spruce, northern white cedar, and balsam fir. Thus far it has had to import from Europe its supplies of seed of black locust, European larch, and Norway spruce. In 1930 the local Norway pine cone crop failed completely and the department found it necessary to buy 4,500 bushels of Norway pine cones in Minnesota.

The State's present planting program calls for production of approximately 75,000,000 3-year-old trees in 1934. To fulfill this program 11,000 seed beds must be planted with from 4 to 12 ounces of seed each, according to species.

◆

Educational work is now a full-time job for one man in the Virginia Forest Service. James P. Andrews, formerly district forester for the Piedmont section of the State, has been transferred to this work. At present Mr. Andrews is traveling through the State in a truck equipped for showing motion pictures and stereopticon views.

◆

The Georgia Forest Service has begun publication, with a January, 1931, number, of the Georgia Forest Lookout, a 4-page monthly news-letter. The Lookout is to be an organ not only of the Georgia Forest Service but of the Georgia Forestry Association, the 32 timber-protective organizations in Georgia, and the State's vocational schools. The editor is C. A. Whittle, director of education of the Georgia Forest Service.

Central States Forestry Congress Organized

The Central States Forestry Congress held it
meeting in Indianapolis December 3–5, 1930.
of the seven States of Illinois, Indiana, Iowa,
tucky, Missouri, Ohio, and Tennessee took an
part in organizing the congress. Michigan,
Virginia, and Wisconsin, also, had representati
the Indianapolis meeting. The State foresters
the actively participating States served on the arr
ments committee, together with E. F. McC
director of the Central States Forest Exper
Station, and some 25 private citizens. E. M
Bruner, Federal forest inspector in the Central S
was chairman of the committee. The Indiana De
ment of Conservation financed the meeting.

In this first meeting it was thought better to d
many different features of the forestry situation i
Central States than to concentrate on one or a ver
of its aspects. Possibly the greatest emphasis
given to farm forestry and forest research.
character of the program is reflected in the ser
resolutions adopted by the congress. These urge
the agricultural colleges of the region, on the basi
policy of complete land use in their respective S
include training in farm woodland management
requirement in all regular agricultural courses; c
the attention of members of the Federal Congres
of heads of Federal administrative department
need for erosion-control research and request
adequate funds be provided for studying this pro
and developing control methods through for
practices; urge upon all the States in the central
the establishment of forest nurseries adequat
produce forest planting stock in quantities to
their respective needs; urge legislation to pr
adequate protection for forest land within pa
pating States; recommend to the Federal Govern
the provision of additional funds for acceleratin
work of the forest survey of the United States
being carried on under the terms of the McSwe
McNary law, and to the State Governments prov
for an early beginning in collecting data on forest
idle land; commend the program of the national f
reservation commission, and urge that increased f
be speedily provided to permit more rapid expa
of this program.

Although the meeting was largely in the han
professional foresters the program included such s
ers as Richard Lieber, director of the Indiana De
ment of Conservation; Edward C. Elliott, preside
Purdue University; Frank S. Betz, retired man
turer of Hammond, Ind.; W. E. Tharpe, soil spec
of the United States Department of Agriculture;
Young, farm management specialist of Purdue
versity; R. W. Brown, president of the Missouri
Bureau; John I. Shafer, president of the Nat

vood Lumbermen's Association; and R. J. Plaster, ltural agent of the New York Central Lines.

cial registration at the meeting totaled 132.

manent organization of the congress was effected gh adoption of a constitution, and a board of 15 ors was elected.

third day of the meeting was given over to an iobile trip to the newly purchased Morgan-Mon- ounties State Forest of Indiana, situated some 35 southwest of Indianapolis.

s planned to hold the 1931 meeting of the con- n Cincinnati, Ohio.

diana State Nursery Prepares for Large Plantings

ween 800 and 900 bushels of black walnuts have tratified at the Clark County State forest nursery liana in preparation for planting in the spring of Woodland owners, county agents, and school ers cooperated in collecting the walnuts and ship- them to the nursery. Approximately 700,000 ay spruce, northern white pine, and Norway pine ngs have been transplanted at the nursery in ration for planting in 1933.

Clark County forest nursery has a new reser- vith five times the capacity of the old one.

New State Park for Michigan

nd valued at $65,000 in the Irish Hills of Michigan een given to the State by Mercy J. Hayes, of oit, for development as a State park, in memory r brother, the late Senator Walter J. Hayes. property has an area of 466 acres, includes the 60-acre expanse of Round Lake and more than alf mile frontage on Wamplers Lake, fronts on d States Route 112, and is within 60 miles of oit, Toledo, Jackson, Battle Creek, and Lansing. new park will incorporate the Cedar Hills Park, ized some time ago as the only State park in eastern Michigan.

chigan now has 66 State park sites, containing 6 acres and having an appraised valuation of 3,150. Lands given to the State represent a part of this valuation, and some of the other s were acquired through tax delinquency. The 's expenditure in acquiring park sites, in fact, s less than $250,000. The Michigan State park m was begun 11 years ago. By July 1, 1931, the will have spent approximately $1,250,000 on loping and maintaining State parks.

* * *

ve minutes each Friday noon are allotted to the issippi Forest Service by WJDX, the Lamar Life rance Co. broadcasting station in Jackson, Miss., r the head of State's Business.

Florida to Give $9,000 Worth of Firebreak Demonstrations this Year

To encourage Florida timberland owners to construct firebreaks, many thousand miles of which are needed for the protection of longleaf and slash pine stands in the State, the Florida Forest Service is conducting a demonstration project on which it expects to spend $9,000 within the current fiscal year. The project is to some degree experimental; its results are expected to help determine what kind of firebreak and what type of firebreak equipment are best for the Florida pine forests. A McCormick-Deering "Farmall" tractor and a Taylor double-disk plow are being used. The tractor is transported on a 1½-ton Ford truck; the plow and small equipment are carried on a trailer. The demonstrator is assisted by a mechanic who drives the truck and the tractor. Other makes and types of plows will be tried out.

One of the most satisfactory types of firebreak thus far constructed consists in a 7-foot plowed strip made with one trip of the double-disk plow, the soil being thrown each way from the center. This makes a fairly clean break except for a 6 to 10 inch unplowed ridge in the center. An effort is being made to design a third disk to turn over this center strip.

Demonstrations are carried out on land the owners or lessees of which agree to furnish the gasoline and oil for the tractor and the labor needed to clear logs from the right of way. The demonstrator constructs the necessary firebreaks on one-fifth of the part of the property that needs firebreaks, or on at least two sections of land. In arranging for demonstrations preference is given first to turpentine orchards on protection units, next to other land on protection units, and next to turpentine orchards adjacent to or in the vicinity of protection units.

* * *

California had a forestry force of 178 in the field in 1930. In addition the State employed from 6 to 8 men in the forest nursery at Davis, where planting stock is grown for the use of State institutions and for distribution to farmers. The State's 1930 expenditures for forestry purposes were estimated at $325,000. County funds available during the year for forestry activities supervised by the State amounted to $140,000.

* * *

A museum of Louisiana's natural resources and a lecture hall equipped for showing films and slides have been established by the Louisiana Department of Conservation on Royal Street, New Orleans, 1½ blocks from Canal Street. The museum is open to the public without charge, from 10 a. m. to 6 p. m. daily; motion pictures are screened daily and by appointment.

Delaware's First Steps in State Forestry

The beginnings of State forestry in Delaware are recounted by State Forester William S. Taber in a printed report for the period July 1, 1929–June 30, 1930, including a summary of activities in the two preceding years. It was in August of 1927 that the Delaware Forestry Commission came into existence, under provisions of a law enacted in that year.

According to United States census figures, the area of land used for farm crop production in the 1,257,600-acre State of Delaware decreased by more than 40,000 acres in the period 1920-1930. Natural regeneration of pine is expected to reclaim much of the abandoned land in the southern part of the State. In order to grow trees for planting on other abandoned lands, in the spring of 1928 the State forestry commission provided itself with a 4-acre nursery site by purchase and lease of land along the Du Pont Road adjacent to Hudson Pond. The 1929 inventory showed that the nursery contained 648,000 seedlings. While awaiting the opportunity to distribute trees of its own growing the forestry department has purchased 197,950 trees and sold them to Delaware landowners at a nominal charge for forest planting.

A 46-acre tract situated along the Du Pont Road near Ellendale has been purchased as a State forest. Thinning and pruning operations have been carried out on portions of this area, and on portions not fully stocked with trees demonstration and experimental plantings have been made with loblolly pine, cypress, and Asiatic chestnuts. An area of 5 acres along Red Lion Creek, New Castle County, presented by General and Mrs. Coleman Du Pont will be planted with trees this spring in preparation for being opened eventually as a State forest park.

A forest survey has thus far covered 47,057 acres of land in Sussex County. Mr. Taber estimates that approximately 380,000 acres of land in Delaware is stocked with either timber or brush. Of this area 350,000 acres, he estimates, supports a forest growth capable under correct management of producing at least one-half cord of wood per acre per year.

Much of the effort of Mr. Taber and his assistant, Carl P. Fatzinger, is devoted to public education through illustrated lectures, newspaper articles, and publications.

Recently the State forestry department prepared plans to be used by the State highway commission in establishing ornamental plantings along the dual highway between State Road and St. George's.

Under provisions of the Clarke-McNary law Delaware is receiving allotments of Federal funds for use in distributing planting stock and preventing forest fires. For forest fire detection and suppression the State legislature has not as yet appropriated any funds. The State highway police report fires to the forestry department, and the volunteer fire companies in the State have without exception given service in supp
ing forest fires. The forestry department inst
the volunteer suppression forces in fire-control met
supplies them with fire-fighting apparatus, and s
vises their efforts on the fire line. In 1930, volu
fire wardens reported 143 fires covering 28,546
between January 1 and October 15.

New York Camp Grounds Have 267,
Registration in 1930

Campers registered at New York State's large p
camp sites numbered 267,886 in 1930, which is twic
1929 registration and seven times that of 1927.
figure does not include picnickers and others who
the grounds less than a day, or campers at p
grounds other than the large camp grounds having
dent rangers in charge. In the past three years
State's camp grounds of the latter description hav
creased in number from 9 to 17 and several of t
have been more than doubled in size.

New York's public recreation grounds other
those for which registration is quoted include is
property in Lake George, 11 recreational developm
on the St. Lawrence reservation, and more than
small public camp sites in the Adirondacks and C
kills.

A recent purchase brought into State ownership 4
acres of land in the Paradox tract, in Essex Cou
containing some highly desirable sites for public ca
The land consists for the most part of scattered
adjoining land owned by the State or under cont
It includes frontage on Johnson Pond, Paradox L
and Eagle Lake, and is crossed by the Schroon L
Ticonderoga State highway and also the so-ca
Johnson Pond Road.

For this land the State paid $21,603, or app
mately $5.30 per acre.

* * *

Through action of North Carolina and Tenne
conservation authorities 12,000 acres of the Fr
Broad division of the Pisgah National Forest has
come the Andrew Johnson Interstate Game Ref
Approximately half the refuge area lies on each
of the State line. The two States will share admi
tration costs on an equal basis, but the Tenne
game officials have agreed to leave the direction of
refuge altogether in the hands of the North Caro
game warden service.

* * *

A calendar issued by the Florida Forest Service
1931 pictures a scene in a turpentining operation
bears the slogan "Liquid Gold from Thrifty Pi
Keep it Flowing." Legends in smaller lettering st
essentials of good turpentining practice.

Twenty counties of New York State carried out for- ry projects in 1930 under the Hewitt law of 1929 ich authorizes the State to match county appropria- ns for reforestation purposes up to $5,000 per county year. The counties invested $67,556, the State ,832.

* * *

ince August 15, 1930, there have been added to ryland's State forest possessions a tract of 1,200 es near Doncaster, in Charles County, and one of 00 acres in the vicinity of Cedarville, partly in arles and partly in Prince Georges County. These litions brought the total area of Maryland State ests to 25,000 acres.

* * *

A 100-foot steel observation tower with inside stair- y has been completed by the North Carolina For- Service a mile east of Chadbourn, in Columbus unty, on North Carolina Highway No. 20. The e was given to the State by C. R. Bailey, of Chad- urn. This is the twenty-second tower in the ate's fire-detection system.

On June 30, 1930, Michigan held title to 603,475 acres of State forest lands, an increase of 231,171 acres over the total so held at the end of the fiscal year 1927–28. Of the acreage added during the biennium tax delinquency accounted for 176,600; purchase, for 38,536; exchange, for 15,398; and gift, for 637.

* * *

Alabama's first State park was recently established by Governor Graves under authority of an act of September 6, 1927. The park is located on the banks of the Coosa River, in the southwestern part of Talladega County, about a mile east of Owen's Ferry, and has an area of 121 acres.

* * *

A steel observation tower has been erected on the Warm Springs, Ga., timber protective organization area by Georgia Wilkins, Columbus, Ga., as a memorial to her uncle, Charles Davis, for many years owner of the Warm Springs property. The tower was dedicated on December 8 by Gov. Franklin D. Roosevelt.

Education and Extension

Idaho University Institutes Wood Chemistry Research

Work in the chemical utilization of wood and studies forest chemistry have been instituted in the forest oducts laboratories of the University of Idaho, of ich E. E. Hubert has charge. Research in forest emistry is being conducted by E. C. Jahn, a wood and llulose chemist who received training under L. H. ise, of the New York State College of Forestry, and arold Hibbert, of the Pulp and Paper Institute of cGill University, and who studied the pulp and paper dustry in Sweden during the past year as a fellow of e American-Scandinavian Foundation.

ew Haven Property Given to Yale for Botanical and Forestry Use

Property at the corner of Edwards and Prospect reets, New Haven, Conn., which was the home of the te William Whitman Farnum, former treasurer of ale University, has been given to the university to used by the schools of forestry and botany as the illiam Whitman Farnum Memorial Garden. The ft includes a maintenance fund. The donor is rs. Vincent Ardenghi, widow of Mr. Farnum. rs. Ardenghi has suggested that the house included the property might be used as a home for the president of the university, but has stated that if the Yale Corporation decides to tear down the house in order to erect a building for the use of the school of botany or the school of forestry the plan will be acceptable to her. The greenhouse is to be put to use immediately in connection with botanical work of the university, and it is planned to administer the grounds as a supplement to the Marsh Botanical Gardens.

A New Forestry Camp for the University of Maine

Next year's forestry seniors in the University of Maine will have a new woods camp in which to spend the second half of their first semester, according to present plans. Curtis M. Hutchins, formerly a graduate student in the university, has given $1,000 for the purpose of constructing a new permanent camp on condition that the university add a similar amount. It is planned to begin construction of the camp in the spring of this year, on State land near the towns of Princeton and Waite.

Eighteen seniors in the Maine University forestry course attended the winter camp of the present school year, near the town of Grindstone. Prof. R. I. Ashman was in charge of their work, which included study of lumber operations and of silviculture and forest mensuration.

Better Road to Market for Colorado College Forest

In 1931 a new road up Ute Pass having no grades steeper than 6 per cent and having a width such that two heavily loaded trucks can pass anywhere will connect Colorado College's 6,200-acre demonstration forest with Manitou and Colorado Springs, the principal markets for its varied timber products. The old road was double width, but had many sharp turns making it difficult for heavily loaded trucks to pass at any great speed, and had grades as steep as 18 per cent. The improvement of this mountain road and the paving of the 5 miles which were commonly the roughest will permit heavier loads of lumber from the college mill and logs, ties, props, and fuel wood from the forest to be handled with safety and with less wear on the trucks. By reducing hauling costs this will add to the profits of the forest and sawmill and will increase utilization.

Korean Larch Thrives on Manitou Forest

During the past five years the forestry school of Colorado College, at Colorado Springs, has been exchanging forest tree seed with the Korean forest experiment station. Trial sowings and plantings have been made on Manitou Forest, the college's experimental tract, of seed of all the coniferous species of Korea coming from regions having as high altitudes as those of Manitou Forest. The Korean larch has shown exceptional promise and will be used in further experiments. On Manitou Forest plenty of moisture falls during the growing season, but the winters are very dry and many young trees die of winter drought. This larch escapes the danger of winter killing by dropping its needles during the winter, times its needle production during the summer in such a way as to utilize all the favorable weather of the year, and produces a wood having properties not found in the woods of native timber trees.

Forestry in Georgia Rural High Schools

About 20 new agricultural vocational schools started last fall in Georgia are taking up the forestry project begun in the preceding school year by about 100 rural high schools in the State. Each is establishing a school forest, which representatives of the Georgia Forest Service will survey and for which they will make management plans. The school forests are obtained by the schools for practice work under 10-year leases. Demonstrations of tree identification, forest nursery practice, planting, thinning, and timber estimating are conducted on them by the State forest service. On each forest two comparable quarter-acre plots are located side by side, one to be burned over annually and the other to be kept free from fi Trees on the sample plots are marked with metal t bearing numbers, and records are kept of their brea height diameters.

During the past year 40 schools in the State ga ered and planted tree seed to grow seedlings for ref estation. More than 50 students started forest-ma agement projects on their home farms.

A prize of $100 was awarded by the Georgia Forest Association to C. L. Veatch, of Commerce, as Georgia rural high-school teacher having done best work in forestry during the year 1929–30.

Forest Recreation Specialist Discuss Camping

Fay Welch, who during the past seven years h directed the Franklin D. Roosevelt Conservati Camps at the Palisades Interstate Park and priva camps for children, and who has conducted courses training in camp leadership for the American Museu of Natural History and for Columbia University, d cusses his specialty as follows in a statement sent o from the New York State College of Forestry, where is engaged in advanced study in forest recreation:

A summer in a good camp is one of the most vit educational experiences for a boy or girl. Here you is constantly acquiring new skills and interests, develo ing a sound body, and learning to live on good terms give and take with other boys and girls and nature he self. There is nothing artificial about the right kind "lessons" at camp. It is not strange that Presiden Eliot characterized camping as America's most signi cant contribution to education.

Camp directors are learning that it is wrong to hudd tents or bungalows together. They are also discoverin that real camping and forestry activities are more ap propriate than town games and indoor occupation They are finding that to stimulate a constant an feverish competition by means of intricate systems awards is not conducive to the sound health or stab emotional adjustment of the child.

Winter camping is as interesting as summer camp ing and, to a robust person who is prepared to mee weather conditions, just as enjoyable. To know th forest and forest life only in summer is to know but ha the story. Camping in all seasons is increasing rapidl

There are some 26,000 camps in the United State accommodating 2,000,000 young people every yea One-third of these lie northeast of a line drawn fro Philadelphia to Cleveland.

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About 100 North Carolina schools have taken ad vantage of the offer of the State forest service to suppl 1,000 trees without charge to any school that will plan them on its grounds in forest formation. The offer being continued.

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Twenty men were registered for graduate study thi year in the New York State College of Forestry. Th college's total registration for the first semester was 384

armer Gains by Squirrels' Nut Planting

One of the most attractive agricultural sights along orth Carolina Highway No. 10 between Salisbury and atesville is the 3-acre black walnut grove on the farm J. G. Lyerly, writes Extension Forester R. W. raeber; and the trees did not cost their owner even e trouble of planting them. Mr. Lyerly says:

> When I located on this farm in 1904 the land now cupied by the walnut grove had been cut over in a mber operation and was in brush. There was a rge bearing walnut tree just to the rear of my home, e only walnut tree on the farm. Near by in some g hollow oaks the squirrels made their homes. Every ear I could see the squirrels carrying nuts into the rush to hide them. Many of the nuts were not recovered by the squirrels, and germinated in the spring. I ssisted the walnut seedlings by cutting back other prouts or trees. Many of the trees removed were not ut until they were large enough for fire wood. This eld has furnished most of my fire wood for a number of ears, and there is yet much to cut. Some of the walut trees themselves will need to be thinned out where ey are crowded. The land is used also as pasture. he nuts harvested have paid the taxes, the fire wood overed interest on investment, the grazing has been y dividends, and the growing crop of walnut timber ight be classed as a savings account or an undivided urplus.

Minnesota Farmer and Son Prove that Timber Growing Pays

A "father and son" demonstration of farm forestry is a means of winning returns from poor soil is to be seen on property of a farmer named Vaux, near Faribault, in southern Minnesota, writes Extension Forester Parker O. Anderson. Twenty years ago, after repeated unsuccessful attempts to raise a hay crop on low, swampy area of 1½ acres, Mr. Vaux planted the area with European white willows three feet apart. Since then he has taken from this small patch hundreds of fence posts, a great deal of material for repairing his farm buildings, and a number of poles which he has sold to neighbors for making sheds. In addition, three years ago the willow plantation provided material for building two log cabins at Roberts Lake. In the fall of 1930 Mr. Vaux planted two bushels of black walnuts and butternuts around the edges of one of his fields.

While still in high school the son, Harold Vaux, started a grove of Norway poplar on a low peat area on the farm. After 13 years these trees are about 14 or 15 inches in diameter and are from 50 to 55 feet high. Thus their yearly growth has averaged about 1 inch in diameter and about 4 feet in height. When one of the trees was cut after 10 years in the field a timber 12 feet long and 8 inches square was obtained from the butt log, and there were two smaller logs. Recently Harold Vaux, who has now had agricultural college training, began planting Carolina poplar on steep hillsides and on sloughs that can not be drained.

A wild woodland on the Vaux farm has for years provided the family with an annual supply of from 10 to 14 cords of fuel wood. Last year 10,000 feet of oak from this woodlot was sawed into lumber and disposed of locally at $40 per 1,000 feet. The sugar maple from this woodland, sawed into commercial sizes, finds a ready market locally at $75 per 1,000 feet. Basswood and elm also command a very profitable price. In Mr. Vaux's machine shed, stored away to dry, are large boards of walnut, butternut, cherry, oak, elm, maple, poplar, and basswood.

Texarkana Lions Sponsor Forestry Campaign

The Lions Club of Texarkana, Ark.-Tex., has been active for the past two years in efforts to encourage farm forestry, particularly the prevention of woods fires, in its neighborhood. In November, 1930, the club cooperated with county agents and others in arranging a series of forestry meetings in Bowie and Cass Counties, Tex. Eight night meetings were held in schoolhouses. The farm people who gathered at these meetings heard short forestry talks by C. W. Simmons, Texas extension forester; J. R. Thigpen, lecturer of the Texas Forest Service; County Agents W. R. Holsey (Cass County) and C. R. Littlefield (Bowie County); and W. R. Mattoon, extension forester of the United States Forest Service. They saw also the Department of Agriculture films "Friends of Man" and "Pines that Come Back," projected by Mr. Thigpen with apparatus with which the Texas Forest Service has equipped him. Eight field meetings were held, usually on the morning following the schoolhouse meeting and in pine woods in the immediate neighborhood of the schoolhouse. When principles of thinning pine stands had been discussed and illustrated a special measuring card adapted by Mr. Simmons was distributed and its use explained. The farmers and school boys present then competed in estimating the board-foot contents of selected trees. The reward to the individual whose estimate came nearest to that of Mr. Simmons was a double-bitted ax donated by the Lions Club.

Attendance averaged 178 at evening meetings and 38 at woods meetings.

* * *

"Soil-saving" demonstrations feature the current program of County Agent Secor in Van Buren County, Iowa. Where good fields are threatened by the washing out of gullies Mr. Secor advises the owners to plant cottonwoods and willows in the bottoms of the gullies and black locusts on the sides and tops. On a number of farms this has been done with pronouncedly beneficial results. Mr. Secor recommends that the willows and cottonwoods be taken from along rivers and streams, and that the black locusts be raised from the seed in garden rows.

Last year 700 farmers of Custer County, Nebr., planted 250,000 forest trees in cooperation with the extension service, following a special tree-planting campaign launched by County Agent M. L. Gould. In the preceding year only 38,000 trees had been planted in the county in farm forestry projects under extension auspices. All the plantings were for the establishment of windbreaks and shelter belts or for home beautification. As a by-product of the farm plantings, the county superintendent of schools reported, plantings were made on the grounds of 90 per cent of the schools in the county.

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A circular on the marketing of Illinois forest products has been prepared by Extension Forester L. E. Sawyer for distribution to woodland owners in that State. It lists consumers of forest products in Illinois and in neighboring States.

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Six 4-H forestry clubs were organized in Idaho in 1930, the first year of 4-H forestry work in that State. The clubs enrolled 104 members. Three of the clubs were formed early enough in the year to complete the first-year project.

Cooperative Selling Increases Christmas-Tree Returns

Twenty farmers in the vicinity of Colebrook, N. H., cooperated this winter in loading and shipping four carloads of Christmas trees, and by so doing obtained about 20 per cent greater returns. This experiment in cooperative marketing was directed by C. S. Herr, extension forester of Lancaster. The 7,200 trees sold, principally balsam fir, were of high quality. A red tag fastened to each tree before it was shipped read "This tree brings a Christmas message from the great outdoors. Its cutting was not destructive, but gave needed room for neighboring trees to grow faster and better." On the reverse the tag bore the name and address of the retailer handling the tree.

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More than 2,000 specimens of wood from the Peruvian Amazon region were recently added to the Yale School of Forestry's collections. The specimens were collected by L. Williams, assistant in wood technology at the Field Museum of Natural History, and were acquired by the school through exchange with the museum. The Yale wood collections now contain about 19,500 specimens.

Forest Service Notes

Fifty Million Feet of Aspen Sold on Chippewa Forest

By Howard Hopkins, United States Forest Service

About 52,000,000 board feet of aspen timber on the northeast portion of the Chippewa National Forest, Minn., was recently sold by the Government to firms manufacturing box material. The poorer grades will be used for crating; the better grades will go to the packing houses in the form of containers for butter, lard, and other food products, a use for which aspen is especially desirable because of its light weight, whiteness, and freedom from taste or odor. This sale, which includes with the aspen about 13,000,000 board feet of timber of other species, was awarded in two units: One comprising the stumpage on a portion of the Cut Foot Working Circle, the timber from which will go in the main to a mill at Deer River, Minn., on the eastern edge of the forest, and one comprising the stumpage on a portion of the Third River Working Circle, the timber from which will go principally to a mill at Cass Lake, Minn., on the western edge of the forest. A 6-year operation is provided for in the first case, a 10-year operation in the second.

This sale involves the largest body of aspen stumpage ever sold at one time by the Forest Service, and it has several other features of special significance. It is the first large sale in which the Forest Service has availed itself of the provisions of section 3 of the act of June 9, 1930, commonly known as the Knutson-Vandenberg Act. Under this new law governing sales of timber on the national forests, the sale agreement itself makes provision for bringing about the development of an improved stand of timber on the sale area. The law requires that in such sales the buyer shall agree to make a special deposit (which in this instance was fixed at 25 cents per 1,000 board feet of saw timber cut) to provide for the seeding, planting, or cultural improvement of the sale area following the cutting. This removes much uncertainty from Forest Service plans for such work by insuring that the necessary funds will be available and that they will be available at the proper time. In the second place, the sale on the Cut Foot Working Circle represents the first timber sale made on the Chippewa National Forest under an approved timber management plan providing for perpetual sustained yield. The annual cut from this unit is set at from 2,000,000 to 2,500,000 board feet. Finally, the sale agreement will allow very economical scaling. The aspen logs are to be measured by the linear foot and a converting factor applied to ascertain their volume in board feet. This procedure is especially desirable for handling large quantities of low-volume stumpage of uniform cull.

As a result of the Chippewa Forest's steady sustained yield of timber products the towns in its vicinity are ong the most prosperous and optimistic in northern nnesota. The following statement was published torially in the Cass Lake Times of December 18, 30:

> In 1905 and for years after, the Cass Lake Times was bitter enemy of the forest policies, for its owners ought with other honest men that the permanent osperity of this country depended on the stripping off the forest and the application of the mattock and the ow of the settler and the farmer. In 1905 the Chip- wa National Forest did not have a friend among the siness men of Cass Lake. To-day the forest can not d an out-and-out enemy of its policies. * * * e forest is the greatest asset that Cass Lake has, and e business men of Cass Lake, without an exception, w realize this very thing.

umber Firm Gives Virgin Pine Area to the United States

Twenty acres of highly valuable virgin northern ite pine and hemlock land in Forest County, Pa., s been presented to the Government by the lumber- anufacturing firm of Wheeler & Dusenbury. The nd is a portion of the Heart's Content area, of ich the Government purchased 101 acres from heeler & Dusenbury in 1929. Like the purchased nd, the gift area will become a part of the Allegheny ational Forest. In notifying the donors of the overnment's acceptance of the gift C. F. Marvin, ting Secretary of Agriculture, wrote:

> It is planned to maintain this land in a virgin forest ndition affected only by such changes as may result om natural organic forces. In this condition it will rve a useful and important purpose as a forest boratory for the investigation of forest soil problems. the same time the public will have free access to the ea, under such restrictions as will protect it from jury. It is believed that through the medium of is use in contributing to the rebuilding of the white ne forest of the northeastern States, and as an exam- e available to the public of the kind of timber which ce clothed this region, the gift will be of greatest nefit to the people of this region and to those of the ited States.
>
> Your donation of land is among the first of this kind any magnitude made by a lumber company to be ed for the benefit of research and with the object promoting a better development of forest lands in e future.

N. P. Wheeler, jr., replying for the donors, wrote:

> I know that all those interested in the firm of heeler & Dusenbury were glad to make this donation. ose of us actively engaged in the lumber business ve a very deep attachment for virgin white pine d have long dreaded the time when the last white ne tree would be cut on this particular logging show.

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Quarters for the Intermountain Forest Experiment ation have been leased in the Hotel Bigelow, Ogden, ah. Director C. L. Forsling now has a technical aff of 1 silviculturist, 1 ecologist, 5 range examiners, d 1 biologist.

National Forest Purchases Approved at Exceptionally Low Price

Meeting December 3, the National Forest Reservation Commission approved the purchase of 257,081 acres of land at an average price of $2.63 per acre. This average price is lower than that of the purchases authorized by the commission in any year of its history. The price is partly explained by the fact that the areas approved for purchase are located largely in the Lake States and in the southern pine regions. Land in 27 purchase units is included in the program.

The commission authorized abandonment of the St. Croix purchase unit in eastern Minnesota, previously approved, and in lieu of it approved the establishment of the Mesaba purchase unit of 181,000 acres, just north of Virginia, Minn., and midway between the Superior and Chippewa National Forests, Minn. It also approved additions to the Ocala and Ouachita purchase units, in Florida and Arkansas, respectively, and approved changing the names of the Mackinac and Keweenaw units, in Michigan, to Hiawatha and Ottawa, respectively.

The largest single purchase approved at this meeting is 53,357 acres in the Kiamichi unit, in Oklahoma and Arkansas. The new program covers purchase of 71,306 acres of land in Michigan, 51,885 acres in Florida, 17,939 acres in Minnesota, 19,199 acres in Wisconsin, and smaller areas in Alabama, Georgia, Louisiana, the Carolinas, Virginia, West Virginia, Tennessee, Pennsylvania, New Hampshire, and Maine.

Swift Decay of Douglas Fir Seed on Floor of Virgin Forest

To learn how long Douglas fir seed may lie on the forest floor in the dense shade of virgin timber and remain viable L. A. Isaac, of the Pacific Northwest Forest Experiment Station, recorded for two years the germination of seed so situated, within a rodent-proof inclosure. He sowed 9,000 seed on each of three 4-foot squares. On the first square the seed was sown in spaded soil from which roots had been removed, on the second it was sown on the surface of the duff, and on the third it was placed under a 1-inch layer of duff. At the time when the seed was sown, samples tested were 86 per cent sound and showed a germination of 53 per cent. Within the 2-year period 3.5 per cent of the seed germinated, two-thirds of the germination taking place in the first year. When a sample of the seed remaining at the end of the period was examined none of it was found to be viable. A large proportion of it had germinated sufficiently to crack open, but by far the greater portion had decayed. According to the results of this test Douglas fir seed, to be a factor in restocking forest land following the cutting of old-growth timber, must have fallen within a year or at most two years previous to the time of cutting.

Successful Storage of Longleaf Pine Seed

By Philip C. Wakeley, United States Forest Service

Tests recently completed by the Southern Forest Experiment Station show that successful storage of longleaf pine seed is not impossible or even difficult. Seed stored at low temperatures in tight containers germinated well a year or even two years after collection. Records of the tests are given in the following table:

Crop	Method of storage	Germination per cent		
		Fresh	After 1 year	After 2 years
1927	Sealed glass jars at 25°–30° F.	85	81	82
1928	Friction-top can in ice box, 60°–70° F.	89	75	------
1929	Loose-covered cans in fish house, 20°–60° F.	49. 2 46. 8	28. 4 26. 4	------ ------

In a commercial nursery test reported to the station, longleaf pine seed that showed a germination percentage of approximately 80 when fresh showed one of approximately 50 after being stored in loose-covered cans at air temperature from November to May and near freezing from May to February.

The figures give some indication that the more tightly covered the containers, the better the result.

In general the germination of cold-storage longleaf pine seed has been as prompt as that of fresh seed, if not prompter.

No other method of storage that has come to the attention of the southern station has so consistently preserved the vitality of longleaf seed. The station recommends that State forestry departments and lumber companies having surplus longleaf pine seed of the current crop put the seed, thoroughly dry, in tightly covered cans and keep it at 32°-35° F. until it is needed for use a year hence. It is expected that the method will work equally well with seed of slash, loblolly, and shortleaf pines.

Florida Pines Bear Hidden Marks of Hurricane

Fifty longleaf pines in western Florida that were cut in 1928 for study by the Forest Products Laboratory did not reveal by the positions in which they were then growing that they been injured by the hurricane of September, 1926. Examination of their wood, however, revealed traces of the hurricane, known to have passed over the region where the trees grew. The annual ring for 1926 showed that growth was normal through most of the growing season of that year; but toward its outer edge appeared compression wood, evidently recording the bent position into whic the trees were forced by the hurricane. The formation of compression wood continued through 1927; i 1928 it ceased in some of the trees and became les pronounced in others.

Compression wood is the abnormal type of woo that occurs on the lower sides of leaning trunks o softwood trees and on the under sides of their branche It is distinguished from normal wood by the relativel greater width of the section of the annual ring i which it occurs, and its summerwood lacks the norma hard, flinty appearance. As seen under the microscop it differs from normal wood in that most of the cells ar nearly circular in cross section instead of rectangula or polygonal, and are separated at the corners instea of being completely joined one with another. Its ce walls, also, have spiral checks not present in norma wood. An outstanding characteristic lessening th usefulness of compression wood is the fact that it longitudinal shrinkage is from 3 to 35 times as grea as that of normal wood. This excessive shrinkag frequently causes bowing, twisting, and splitting o softwood lumber.

Douglas Fir Forest Intercepts Third o Summer Precipitation

Precipitation measurements made in the open an under a mature stand of Douglas fir during 118 summe showers in the Wind River Valley, Wash., by A. G Simson, of the Pacific Northwest Forest Experimen Station, indicated that on the average the forest intercepted 34 per cent of the precipitation during thes showers. With 8 to 12 gages so distributed that th density of the forest canopy over them ranged from 5 t 95 per cent, 777 measurements were made. The gage used in the open were placed one-half mile from th forest. As shown by the gages in the open, precipitation during the 118 showers ranged from a mere trac to 3.99 inches per shower, and totaled 48.38 inches The average precipitation per shower was 0.41 inch, an the quantity recorded most often was about 0.04 inch In the case of light showers, little or none of the precipitation reached the ground under the trees.

With 12 gages placed at 20-foot intervals, checker board fashion, 522 additional precipitation measurements were made under a dense 25-year-old Dougla fir stand. These indicated interception of 43 per cen of the summer rainfall. A small portion of this apparent interception, Mr. Simson remarks, was probabl accounted for by run-off down the trunks of the trees

Mr. Simson's report on his findings concludes wit the warning: "In the absence of positive knowledge, i is dangerous business for the forest protectionist t assume that a summer shower has caused any significant changes in the fire hazard in the forest itself regardless of the effect in the open."

New Undertaking in Tropical Forestry

By J. C. Kircher, United States Forest Service

A report on forest conditions in the Virgin Islands epared by W. P. Kramer, supervisor of the Luquillo ational Forest, Porto Rico, in connection with a ıdy of the islands by a commission the chairman of hich was Herbert Brown, Chief of the Bureau of ficiency, has led to a request that the Forest Service dertake some needed forestry work there. Funds r the purpose have been transferred to the Forest rvice by the Navy Department. William R. rbour is returning to the service to take charge of e project under Mr. Kramer's general direction. nce leaving national forest acquisition work in 1918 r. Barbour has had tropical forestry experience in aiti, Santo Domingo, Cuba, Venezuela, British onduras, and elsewhere. Most recently he has been nnected with the Tropical Plant Research Foundaon, engaging in explorations of tropical hardwoods.

This spring a more thorough survey will be made of restry problems of the islands and some planting ill be done. Planting stock will be obtained from e insular forest nursery at Rio Piedras, P. R.

The hardwood stands which originally covered the irgin Islands have largely been cut, and much of the rest land is now denuded. The island of St. John ill has some second-growth timber and a number of ightly culled areas, but on the other islands of the roup a large proportion of the forest area has been ken by brush. St. John is the center of the bay-rum dustry, and some bay forests are being grown for his purpose, but the industry has been on the decrease recent years. The only publicly owned forest land n the islands at present is municipal property totaling bout 1,400 acres, which is not under forestry managenent. According to Mr. Kramer's estimate approxinately half the area of the islands, or about 40,000 cres, is suitable only for the production of forest rops. About 20,000 acres of this forest land, he elieves, can be brought back to forest growth by rotecting it against fire and grazing, but the remainder vill need to be planted.

The rapid growth of tropical hardwoods makes it eem practicable to reforest the islands. Such valuable pecies as mahogany and Spanish cedar would unloubtedly do well on many of the mountain areas. Planted forests would become valuable not only for much-needed timber supply but also to protect the teeper mountain slopes from erosion and to conserve vater supplies.

The Virgin Islands lie about 40 miles east of Porto Rico. Most of the one hundred-odd members of the roup are small and uninhabited. The three of greatest mportance are St. Croix, with an area of 53,000 acres; St. Thomas, with 16,000 acres; and St. John, with 2,000 acres. The topography of the islands is rolling to rough; their highest peaks rise to 1,500 feet elevation. Temperature is rather even, ranging between 70° and 90° throughout the year. The population, which has been steadily decreasing, is now about 20,000.

Because of their size, the islands do not present an attractive field for national forest extension.

The Inside Story of Slash Pine on Areas Subject to Frequent Fires

By Philip C. Wakeley, United States Forest Service

During the past six years the part played by fire in preventing the establishment and spread of slash pine has been shown strikingly and in detail in St. Tammany Parish, La., on cut-over areas aggregating more than 1,000 acres. The areas lie along the highway and railroad leading to the Bogalusa branch station of the Southern Forest Experiment Station, and have been observed monthly or oftener by members of the southern station staff.

St. Tammany Parish is at the western edge of the natural range of slash pine. Over most of the areas referred to the old-growth stand was longleaf pine; but along each "branch" and in each wet hollow, probably because burning was relatively infrequent in such places, there were a few slash pines. The land between the branches was burned annually or every other year. Logging prior to 1924 left a few small longleaf and slash pine seed trees scattered over the areas.

In the fall of 1924 there was an excellent crop of slash pine seed. There was also a severe drought, which resulted in many early fires. The areas under discussion were for the most part burned over after the seed fell but before it germinated, germination being delayed by the drought. When the seedlings finally started in December and January there was practically no fresh fuel on the ground, and they accordingly escaped being killed by late winter and early spring fires.

In 1926 and in 1927 the areas escaped burning. During this time casual inspection from the highway and the railroad showed no young growth, as the seedlings were still hidden in the tall grass. In the late fall of 1927, however, when the grass turned brown and was matted down by rains, the tops of a good stand of seedlings began to show. By the fall of 1928, from 800 to 1,200 seedlings per acre were well above the grass, spaced almost as evenly as in a plantation and growing thriftily. The Southern Forest Experiment Station had no record of finer reproduction of slash pine anywhere in its territory.

Then came the fires. The first fire got out of control in the winter of 1928–29 during the burning of a railroad right of way and killed most of the seedlings on several hundred acres. The survivors were badly stunted, and succumbed to a second fire the following winter. Other fires in the dry fall of 1929 swept the remaining areas with the exception of one patch. This patch was burned during the severe drought in the spring of 1930.

Now, six years after the seed was shed, nothing remains on all the 1,000 acres but a few hundred scattered, deformed, fire-stunted seedlings. If it were not for the written records kept by the southern station, there would be nothing to show that at one time during the six years the entire 1,000 acres supported a superlatively fine stand of thrifty young slash pines.

Some Effects of Irrigation and Fertilization on the Size of Longleaf Pine Needles

By J. ELTON LODEWICK,[1] Virginia Polytechnic Institute

Although great strides have been made in the use of irrigation and fertilizers in growing field crops, comparatively little is known as to the effect of such treatment on forest trees. Variation in site conditions may modify a tree's rate of growth, its size and form, and the quality of its wood. Which of the environmental factors related to the soil are operative in producing these modifications is not known.

Several years ago the Forest Products Laboratory started a series of experiments with longleaf pine (*Pinus palustris* Miller) on irrigated and on fertilized sites on the Choctawhatchee National Forest, in western Florida. The investigations were designed primarily to determine what effect variations in the quantities of irrigation water and commercial fertilizers applied would have on the structure of the wood. In each of the first three seasons during which the investigation was under way marked differences in crown density and needle length were observed on certain of the experimental plots. While in charge of this work during the summer of 1928, I attempted to analyze these differences by measurements of a series of needles from each plot, primarily in order to determine whether or not the progression of growth in the needles could be used as an indicator of the efficacy of the various treatments. Though this phase of the investigation was carried on during but one season, and no opportunity for further studies has presented itself, the results may be of use to others as a basis for further investigation.

Apparently but few investigations have been made as to the continued increase in size of the needles of conifers over the period of their retention. Büsgen (*2*) reports that length increments after the first surge of growth result from the activity of a basal meristem. Meissner (*6*) found no characteristic perennial lengthening of the needles in pine, spruce, fir, Douglas fir, or hemlock.

The soil in the region of the Choctawhatchee National Forest is a deep, loose Norfolk sand with a maximum water-holding capacity of approximately 8 cent. Not enough organic material is present in or the soil to call for consideration. Rainfall avera about 60 inches per year and is evenly distribut throughout the vegetative season.

Measurements were made of needles obtained fr the lower branches of one tree in each of the eight grou that received a cultural treatment in the experime In order to avoid any effect dependent upon vigor d to size, care was taken to select trees as nearly as p sible of the same diameter class. In crown densi also, each tree selected represented the average for t group receiving the same treatment. Thus each sa ple tree was as nearly typical of the group it represent as could be observed. Measurements were made f the most part during late July and early Septemb 1928. The length of the needles was measured with scale graduated in millimeters, and the diameters we measured with a micrometer caliper at approximate the middle of each needle. Needle lengthening a peared to have ceased for the season in all trees exce those fertilized with a nitrate-potash-sulphate co bination.

Preliminary measurements were made in order determine, if possible, the extent of variation in need length and diameter on an individual tree. For th purpose a young forest-grown tree 3 inches in diamet and 20 feet tall was selected. The measurement made in June, 1928, indicate that the needles on th leader, which is more vigorous in growth, are long than those on the laterals; that the needles increase length during their second year; and that the mo vigorous parts attain a larger proportion of their fin length during the first growing season.

While these data were being obtained an appare relation was observed between the length of needl and their position on the twig. The fascicles we removed and measured in groups of 20 beginning at th base of the current year's growth and progressi toward the apex. It was found that average need length becomes greater the farther the needles a situated from the base of the year's growth, except th a shorter length is again shown by the last few grou near the apex. The same sequence was noted whe leaders from two other trees of comparable size we examined during the fall of 1929. When the data s obtained were plotted there was a marked flattening the curve at a point slightly beyond the middle. Th resembles the flattening noted by Brown (*1*), Friedric (*3*), Jost (*4*), Mischke (*7*), and Lodewick (*5*) in diamete growth curves of the boles of trees of other species. retardation of needle growth may occur during th transition period between the formation of spring woo and the formation of summer wood.

Since the data obtained on needle length as correlate with irrigation and with the use of commercial fertilizer are for only one tree under each cultural treatment an for only one season, they are not complete enough to b presented in tabular form. The following inferences, however, may be drawn from them. (1) The diameters of the needles were not measurably affected by irrigation or by the use of fertilizers. (2) Irrigation apparently increased the needle length during a dry season. In a year of normal precipitation the water added during irrigation exerted but little influence on the needle length. (3) Trees on fertilized soils showed longer needles than did those on unfertilized sites. The effect was more apparent where a nitrogen-phosphorus mixture had been used than where nitrogen alone had been used. (4) The needles from the trees on the fertilized sites appeared to have had a longer period of growth in length than those on the unfertilized sites.

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[1] Formerly a member of the staff of the U. S. Forest Products Laboratory.

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Storax Production

By **Eloise Gerry**, United States Forest Service

Recent news of interest to owners of red gum (*Liquidambar styraciflua* Linnæus) timber is to the effect that there has been an increase in the demand for American-produced storax. Storax (or styrax) is the commercial name for the grayish-brown, sticky, semiliquid substance, known locally as sweet gum, which the red gum tree exudes when wounded. Storax is valued for use in pharmaceutical preparations and adhesives, for incense, for perfuming such products as soap and glove powder, and for flavoring tobacco. For the past two years the quantity imported annually into the United States has exceeded 40,000 pounds. The import prices, for material of widely varying quality, have ranged from $0.40 to $3 per pound. Storax from red gum grown in the United States appears to be as satisfactory for all purposes as the more widely known and used storax from Asia Minor, which is a product of the species Liquidambar orientalis Miller.

Unlike the oleoresin of pines, storax is not present in significant quantities in the normal wood. Its formation is induced by cuts or wounds that expose the surface of the wood beneath the bark. The storax is developed in the new wood that grows when the wound has been made. It exudes from wound resin passages, coating the wood and often soaking into the bark. Preliminary experiments by the Forest Products Laboratory indicated that comparatively small wounds yield more storax than severe ones. Completely girdling a tree resulted in a smaller yield of storax than four approximately horizontal cuts, about ½ inch wide, spaced 4 inches apart, and about 12 feet long altogether.

A microscopical study of specimens taken from the wood surrounding horizontal cuts indicated that the cuts nearer the ground were less productive than those above them. This difference in yield is due not to height on the tree but to the fact that the upper cuts hinder the supply of nutritive material from reaching the lower cuts. It is recommended that not more than two horizontal cuts be made one above the other, and particularly that a vertical bar of about 8 inches of bark be left between pairs of cuts to insure a good opportunity for the circulation of the sap. Cuts should be made low on the butts or on large branches.

The type of scarring described might be further modified by adding vertical cuts, although these are known to be less productive than horizontal cuts of the same length. Tin cans or cups such as are used in turpentining could be used to catch the storax. It is possible that a metal turpentine apron or gutter carefully tacked onto the bark below each cut would reduce the waste that results from the storax soaking into the bark.

Hacks or "hogals" such as those used in the turpentining industry would probably serve best to make the cuts or wounds. Deep cuts are apparently both unnecessary and harmful. All that is needed appears to be a clean cut exposing the outermost layer, or the last year's growth, of the wood. This cut should probably be freshened about every four weeks by removing a shaving about one-half inch thick on the upper side of the cut.

Before shipping the gum the producer usually cleans it by heating it in a double boiler and filtering it through cheesecloth. The collected gum should be kept cool to prevent or reduce fermentation. Shipment can be made in friction-top tin cans.

Trees with decayed hearts or crooked trunks, which will not make good lumber, will often serve well for storax production. Where possible the collection of storax should be made in advance of a lumbering operation, so that the scarred trees need not stand for any great length of time exposed to insect or fungus attack. Among the hardwood species cut in the South, red gum ranks second only to the oaks. It composes about 25 per cent of the total annual cut of hardwoods in the United States, and about 2 per cent of the total cut of all species. On large tracts where red gum makes up 15 to 50 per cent of the timber cut it should be possible to combine storax production with cutting. Where trees are scattered and are not highly valued for lumber, farmers or high-school boys or others may be able to carry on small-scale operations during their spare time, for storax is purchased in lots as small as 4 pounds each.

The yield obtained in Louisiana from the horizontal wounds described in the foregoing averaged 2.5 ounces per tree per year. Total girdling of trees gave a yield of only 1.5 ounces for each tree. The highest yields are said to be obtained in the warmer regions and in the warmer seasons.

Further experiments are needed to determine optimum conditions for storax production. Until more is known about all angles of the problem great care should be taken not to damage valuable timber through wounding it to obtain storax.

Seed Collection of 1930 in Northern Rocky Mountains

Western white pine seed collected and extracted on the Kaniksu National Forest, Wash.-Idaho, in the fall of 1930 cost the Forest Service $2.14 a pound. In the preceding 15 years the cost to the service of collecting and extracting seed of this species averaged about $3.50 a pound. The low cost in 1930 was due principally to good yield from the cones and efficient operation of the seed extractory. The regular price of 75 cents a sack was paid for the cones. On the average each sack of cones yielded .88 pound of seed. The cost per pound of seed included 86 cents for cone collection, 78 cents for extraction work, and 50 cents depreciation on improvements and equipment. About 600 pounds of seed was collected.

An unusually complete and ample 3-year supply of seed of the more important forest tree species of the northern Rocky Mountain region was collected in 1930 by national forest officers for use in local reforestation projects.

[Correction: Seed-crop observations of Jacob Roeser, jr., quoted on page 14 of the Forest Worker of November, 1930, had as their field not the northern Rocky Mountain region (Montana, northern Idaho, etc.) but the Rocky Mountain region (Wyoming, Colorado, etc.).]

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The one-fourth share of national forest receipts which by law goes to the counties containing the forests, to be used for roads and schools, amounted for the fiscal year 1930 to $1,677,559. It was divided among 28 States, Alaska, and Porto Rico. The one-tenth share available to the Forest Service for constructing roads and trails on the national forests amounted for the year to $671,023.

General Forest News

Use of Plows and Pumps for Fire Fighting in the Douglas Fir Region

By C. S. Cowan, Washington Forest Fire Association

Before caterpillar tractors and plows could be introduced as forest fire fighting equipment in the Douglas fir region it was necessary to devise a special type of plow. The plow developed for use in the pine regions of Oregon, California, and Washington, where the caterpillar tractor and plow were introduced as fire-fighting apparatus some time ago, was found unsuitable to the rougher Douglas fir type of country, with its heavy litter, dense stands of timber or stumps, and heavy slash. The Killifer "pan buster," a 2-faced plow used in digging irrigation ditches, proved to be badly placed for fire fighting purposes, and its carriage frame and wheels were not equal to the tremendous strains placed upon them by the work of making fire trails in rugged country. The pan buster served, however, as the model on which a suitable plow was finally developed. Two plow blades formed of boiler plate were welded to a gooseneck of 60-pound railroad steel, which was reinforced between the web and the flange. The gooseneck carried the point of the plow some 30 inches behind the wheels. The placing of the plow to the rear prevented clogging between the plow proper and the wheels. The wheels themselves were reinforced with 3-inch channel iron, which kept them round and kept the (iron) spokes in place. The frame, which developed a tendency to spread under long pulling strains, was effectively strengthened with a brace welded from one side to the other.

A 15 caterpillar tractor was found to be best adapted to work in the Douglas fir country so far as concerns the Washington Forest Fire Association, which in getting its fire equipment to the scene of action has to transport it over long distances. For general work it was found advisable to place a stout metal tool box upon one of the fenders of the tractor and to reinforce both fenders. In the tool box were carried two blocks with 5-inch sheaves, and two wire rope straps. On the rear of the tractor was attached a reel with 175 feet of soft steel wire rope, together with a choker. This made it possible to move logs and down trees without bucking, and helped in swamping out the line as a preliminary to the actual trail building.

It was found that one caterpillar tractor and plow with a crew of two (one to drive and one to ride the plow), plus a swamping crew ranging from four to eight, according to the type of ground cover, could build from 3 to 4 miles of excellent fire trail per day. This trail was distinctly better than a handmade trail. The plow action left plenty of loose earth available to hoveled onto the fire, whereas a handmade trail ply exposes the mineral soil. It appears further the "cat"-made trail, instead of disappearing or ming useless in one year as a handmade trail often , will last for several years. Roots of living trees o 3 inches in diameter offered little resistance to plow and tractor.

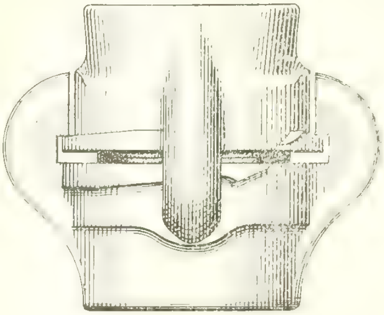
ext came the problem of transportation. The of a truck to transport such a piece of equipment, hing around 5,000 pounds, may easily exceed the of the equipment itself. A low-bed truck was ht, with the purpose of keeping the weight close he ground and obviating the risk of accidents in nection with the loading and unloading operations. one chosen was the Golden State Lo Bed truck, an mbled truck with a Ford power plant plus a strong able body carrying its own system of transmission, h braking power fully up to requirements. The ling system was found inadequate, but addition of -gallon auxiliary water tank above the power plant this matter in order. The cost of this truck was out half that of a standard low-bed truck with suf- ent weight-carrying capacity. In view of the small eage run annually, all requirements as to perform- e were met.

The usefulness of the equipment has been proved ond all doubt. By increasing the speed of trail ilding it reduces acreage burned over; it builds bet- trail; and it reduces man-power requirements and, refore, reduces fire-fighting costs and damage. ere is the further point that not so many shovels, ttocks, axes, and other hand tools disappear as un- r the old system of fire-line building.

This outfit does not completely meet the fire-line con- uction needs of the Douglas fir region, of course; on st fires in the region it can not be used, because of pography, density of débris, etc. But it can be used a greater proportion of cases than was originally ought possible, and it is sufficiently successful to arrant the purchase of additional equipment of a simi- r nature. Such purchase is planned both by the ate and by the Washington Forest Fire Association.

The usefulness of pumps in fire fighting is already ell tested. We believe in having available in large umbers a light-weight pump such as can be carried by e man. In the operation of pumps much depends pon the operator. The type of pumps in general use this association is the Pacific Marine, which as a rule ves very little trouble if treated with average care.

Some years ago the British Columbia Forest Service perimented with a universal type of hose connection. hile an improvement on the screw type of connection, is was not altogether satisfactory. During 1930 the ashington Forest Fire Association, working in con- nction with the Seattle Brass Co., evolved a univer- l coupling patterned somewhat upon the type tried t in British Columbia which apparently remedies all the defects found in that type. This coupling, shown in the accompanying drawing, requires but an inch turn to make connections, is absolutely watertight, and has the advantage of utilizing the water pressure in such a way as to become tighter with every pound of pressure increase. It can be used for all connections. It can always be connected with standard screw type connections through an adapter carried upon the nozzle. As compared with screw couplings it saves some 20 minutes in connecting 1,000 feet of hose. This universal coupling met with instant approval of the field men in our force. Some 80,000 feet of hose was equipped with it, and not a single complaint has been received as to its efficiency. To our minds, this is the greatest advance brought out in recent years in type of connections. We confidently expect to see it adopted by other fire-fighting organizations.



In hose construction little advance has been made. The rubber-lined cotton hose commonly used in forest fire fighting is far too heavy to give satisfaction in the Douglas fir country. It would appear that here is an opening for a progressive hose manufacturer.

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A film strip entitled "Preventing Termite Damage, Series 260," is available for distribution by the Department of Agriculture. The film strip and a 7-page lecture accompanying it can be obtained at a charge of 35 cents from the Office of Cooperative Extension Work, United States Department of Agriculture, Washington, D. C.

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The gypsy-moth laboratory of the United States Bureau of Entomology at Melrose Highlands, Mass., has moved from 17 East Highland Avenue to 1156 Main Street.

❧

Deer killed by hunters in California in the 1930 season numbered 24,131, the State division of fish and game reports. This number exceeds the 1929 kill by 14 per cent.

Society of American Foresters Meets

More than 300 members of the Society of American Foresters gathered in Washington, D. C., for the society's annual meeting in the closing three days of 1930. The meeting marked the passage of 30 years since the society was first formed by a group of seven men, Gifford Pinchot, O. W. Price, W. L. Hall, Ralph Hosmer, Thomas Sherrard, E. T. Allen, and Henry S. Graves. The society's membership is now 1,740.

In opening the meeting with a review of forestry activities and events of the past year President Paul G. Redington spoke particularly of the advantages which the society had gained through creating the full-time position of executive secretary and through obtaining the services of W. R. Hine in that position.

Practitioners of private forestry on a commercial scale held the floor in the opening session of the meeting, with William L. Hall, of Hall, Kellogg & Co., in the chair. Julian E. Rothery, of the International Paper Co., spoke on "the economic approach to forest management." A paper on the management of southern pine for naval stores by I. F. Eldredge, of the Superior Pine Products Co., Georgia, was read. Ernest F. Jones, forester of the Great Northern Paper Co., Bangor, Me., outlined current forestry conceptions of timberland owners in the Northeast spruce region. In that region, Mr. Jones told the society, the adoption of "orthodox" forestry practices such as timber marking is deferred by the uncertainty of adequate returns on the investment involved; but there is no real devastation by logging, fire protection has a creditable record extending back over 20 years, utilization is close, and more trained foresters are employed than in any other region of the same size in North America. Russell Watson, of Banzhaf & Watson (Inc.), Milwaukee consulting foresters, spoke of private forestry in the Lake States. Mr. Watson stated that he knows of no lumber company in the Lake States, "sawing logs and marketing lumber for a living," that plans on a perpetual forestry operation; but that the pulp and paper companies, he is satisfied, will steadily build up permanent producing forests contiguous to their plants. Mr. Watson dwelt especially on the attractive opportunities in the Lake States for independent forestry ventures by foresters. He and his partner, after practicing timber growing for several years as a side line, now make it their principal activity. Suggesting that there is no particular way to explain why more foresters do not practice independently what they learned in school, aside from the fact that "they don't seem to think of it," Mr. Watson concluded "It is an obviously simple thing to do; it offers a lot more fun and is more profitable than most foresters' jobs."

The public land policy of the United States was the subject of an afternoon symposium, in which it was brought out that many of the Western States do not desire transfer to them of public domain lands.

At the society's thirtieth anniversary banquet, Dean H. S. Graves as toastmaster, greetings foresters of Canada, of Great Britain, of France, a Switzerland, respectively, were brought to the so by Ellwood Wilson, of the Canadian Society of F Engineers; W. E. Hiley, of the Imperial For Institute, Oxford; Louis Duplaquet, inspecteu joint des eaux et forêts, Nancy; and J. W. Zeh of the Swiss Society of Foresters. The "Ame epic" of the 30-year growth of the movement forest conservation was ably narrated by Rap Zon. (Through permission granted to Hon. S Leavitt, of Montana, Mr. Zon's address was pri in the Congressional Record of January 5, pp. 1 1448.)

On the second morning a survey of the field of profession of forestry culminated in "a look ahe by Dean Graves. After a period of preparation to 1900, said the dean, American forestry has entered a second period in which the obligations of public in forestry are being recognized, national, St and other public forests are being established, other activities such as organized fire protection, form of taxation, and work in research and educa are being carried forward. History suggests that may anticipate a third period marked by the initia on a substantial scale of forestry on private lands, a fourth period representing the maturing of the wl enterprise, with the stabilizing of economic conditi which will permit a progressive intensification of fore practice. Dean Graves foresees a very material exp sion of public forestry within the next 10 years. factors justifying this expectation he lists the probl of land utilization and public finance presented States and counties by the reversion of land for delinquency; the growing problem of conserving wa and controlling their flow; growing appreciation of public loss caused by present wasteful liquidation some of our natural resources; and the tremend sweep of the forces behind the recreation moveme For the near future he anticipates a new step forwar fire protection. He believes that forestry work in all branches will become increasingly exacting as rega technical knowledge and proficiency, a prospect call for correction of serious deficiencies in the fores educational system of the present.

Some of the information back of Dean Grave remarks on the forestry educational situation brought out when C. H. Guise presented a progr report of the committee on forestry education. M of the field work involved in the study begun by committee in July, 1929, has now been complet and it is hoped to complete next summer a rep covering conditions in all the forestry schools of United States.

Following the report of the committee on industr forestry, presented by Shirley W. Allen, it was cided to continue the work of the committee, which

he nature of a census of industrial concerns prac-
ng forestry.

Technical papers read at the meeting, which are
ng published in the Journal of Forestry, were the
owing: The management of shortleaf and loblolly
e for saw timber, by A. E. Wackerman, Crossett
mber Co.; Chemical utilization of wood waste, by
F. Hawley, Forest Products Laboratory; Forest fire
tection, by S. B. Show, United States Forest
vice; The white pine blister rust in the Inland Em-
e, by S. B. Detwiler, Bureau of Plant Industry; The
ect of defoliation on tamarack, by S. A. Graham,
iversity of Michigan; Erosion, by E. I. Kotok,
ited States Forest Service; and Reforestation of
andoned farm lands in New York State, by Duncan
Rankin, New York State Conservation Commis-
n.

Measures urged in the resolutions adopted by the
iety include adequate provision by Congress for
argement of the Federal program of research in
sion control and streamflow regulation and for
trol of the gypsy moth; provision by Congress and
the States and private landowners for immediate
d adequate steps to control the white pine blister
st; preservation of a primitive area of the Florida
erglades as a national park; the conferring of a
finite legal status as "Indian forests" on all unal-
ted lands within Indian reservations that may be
und to be primarily adapted to the production of
rest crops, needed for purposes of water conserva-
on, or essentially contributory to the prevention of
il erosion; establishment of a foreign agricultural
rvice under which it would be possible to send a
rester abroad to keep American foresters in touch
ith European developments; and action by State
gislatures to make emergency funds available for
restry work on State-owned lands as a measure for
lief of unemployment.

Following adjournment, many members of the
ciety witnessed a field demonstration of the Cham-
on reforesting machine, the rototiller firebreak-
itting machine, and caterpillar tractors, arranged by
tate Forester Besley of Maryland and his staff.

Bryce Canyon Park Enlarged

Bryce Canyon National Park, in southwestern Utah,
more than doubled in area by a presidential procla-
ation of January 5, 1931. To the 14,480 acres of
e park area as formerly established 16,080 acres are
dded by transfer from the Powell National Forest.
he addition includes a crescent of eroded area in the
ink Cliffs that is 8 miles from tip to tip. One point
the newly added territory gives an unobstructed
iew over an arc of 320°. From this point, on a clear
ay, it is possible to see mountain ranges in the five
tates of Utah, Arizona, Colorado, New Mexico, and
Nevada.

When Douglas Found the Sugar Pine

[From journal kept by David Douglas during his travels in North America, 1823-1827]

THURSDAY, Oct. 26, 1826.—Weather dull and cloudy When my people in England are made acquainted with my travels, they may perhaps think I have told them nothing but my miseries. That may be very correct, but I now know that such objects as I am in quest of are not obtained without a share of labour, anxiety of mind, and sometimes risk of personal safety. I left my camp this morning at daylight on an excursion, leaving my guide to take care of the camp and horses until my return in the evening, when I found everything as I wished; in the interval he had dried my wet paper as I desired him. About an hour's walk from my camp I was met by an Indian, who on discovering me strung his bow and placed on his left arm a sleeve of raccoon-skin and stood ready on the defence. As I was well convinced this was prompted through fear, he never before having seen such a being, I laid my gun at my feet on the ground and waved my hand for him to come to me, which he did with great caution. I made him place his bow and quiver beside my gun, and then struck a light and gave him to smoke and a few beads. With my pencil I made a rough sketch of the cone and pine I wanted and showed him it, when he instantly pointed to the hills about fifteen or twenty miles to the south. As I wanted to go in that direction, he seemingly with much good-will went with me. At midday I reached my long-wished *Pinus* (called by the Umpqua tribe *Natele*), and lost no time in examining and endeavoring to collect specimens and seeds. New or strange things seldom fail to make great impressions, and often at first we are liable to over-rate them; and lest I should never see my friends to tell them verbally of this most beautiful and immensely large tree, I now state the dimensions of the largest one I could find that was blown down by the wind: Three feet from the ground, 57 feet 9 inches in circumference; 134 feet from the ground, 17 feet 5 inches; extreme length, 215 feet. The trees are remarkably straight; bark uncommonly smooth for such large timber, of a whitish or light brown colour, and yields a great quantity of gum of a bright amber colour. The large trees are destitute of branches, generally for two-thirds the length of the tree; branches pendulous, and the cones hanging from their points like small sugar-loaves in a grocer's shop, it being only on the very largest trees that cones are seen, and the putting myself in possession of three cones (all I could) nearly brought my life to an end. Being unable to climb or hew down any, I took my gun and was busy clipping them from the branches with ball when eight Indians came at the report of my gun. They were all painted with red earth, armed with bows, arrows, spears of bone, and flint knives, and seemed to me anything but friendly. I endeavored to explain to them what I wanted and they seemed satisfied and sat down to smoke, but had no sooner done so than I perceived one string his bow and another sharpen his flint knife with a pair of wooden pincers and hang it on the wrist of the right hand, which gave me ample testimony of their inclination. To save myself I could not do by flight, and without any hesitation I went backwards six paces and cocked my gun, and then pulled from my belt one of my pistols, which I held in my left hand. I was determined to fight for life. As I as much as possible endeavored to preserve my coolness and perhaps did so, I stood eight or ten minutes looking at them and they at me without a word passing, till one at last, who seemed to be the leader, made a sign for tobacco, which I said they should get on condition of going and fetching me some cones. They went, and as soon as out of sight I picked up my three cones and a few twigs, and made a quick retreat to my camp, which I gained at dusk. The Indian who undertook to be my last guide I sent off, lest he should betray me. Wood of the pine fine, and very heavy; leaves short, in five, with a very short sheath bright green; cones, one 14½ inches long, one 14, and one 13½, and all containing fine seed. A little before this the cones are gathered by the Indians, roasted on the embers, quartered, and the seeds shaken out, which are then dried before the fire and pounded into a sort of flour, and sometimes eaten round [*sic*]. How irksome a night is to such a one as me under my circumstances! Can not speak a word to my guide, not a book to read, constantly in expectation of an attack, and the position I am now in is lying on the grass with my gun beside me, writing by the light of my Columbian candle—namely, a piece of wood containing rosin.

New Bird Refuges Created

Land purchases authorized by the Migratory Bird Conservation Commission on December 18, 1930, will add four units to the series of sanctuaries for which provision was made in the migratory bird conservation act of 1929. A unit along Apalachee Bay, Fla., to be known as the St. Marks Migratory Bird Refuge, contains 13,981 acres. A purchase in California will add 8,982 acres to the Salton Sea Wild Life Refuge, created by an Executive order of November on 15,733 acres of lands in Imperial County, Calif., that are included in the Yuma reclamation project. The Swanquarter Migratory Bird Refuge will be established in North Carolina, on 11,778 acres in Hyde County, on Pamlico Sound, which together with intermingled water areas will make an administrative unit of about 20,000 acres. Purchase of a 39,038-acre sandhill area in Garden County, Nebr., will result in the creation of the Crescent Lake Migratory Bird Refuge.

Units previously approved for purchase or otherwise established as migratory bird refuges under the 1929 law have an aggregate area of 84,387 acres, so that the addition of the units just listed makes the total 158,167 acres.

Quick Poison for Poison Ivy

A poison for undesired plants, such as poison or poison oak, that acts quickly and surely and t clears out of the soil was recently described before American Society of Plant Physiologists by R. Harvey, of the University of Minnesota. It is eth ene oxide, chemically related to the ethylene chlor which has been found to hasten very effectively ripening of fruits and vegetables. Professor Har tried the compound on some large barberry bush marked for destruction because the plant harbors black stem rust of wheat. "Depth charges" of eth ene oxide dissolved in water were sunk into ho pierced in the soil at the roots of the bushes. A f days later every one of the treated bushes was fou to be in the last stages of the death struggle. Abo 1½ ounces of ethylene oxide diluted to a 10 per ce solution in water sufficed for a large bush.

* * *

An unusual demonstration of the rapidity of grow of slash pine planted in Washington Parish, La., reported by Philip C. Wakeley, of the Southern For Experiment Station. Twice during the summer 1930 armed bandits robbed the bank at Angie, L some miles north of Bogalusa, and fled toward Varna and Bogalusa. Each time, upon finding themsel closely pursued they abandoned their car and to refuge on foot in a large plantation of slash pine esta lished in the spring of 1926 on lands of the Gre Southern Lumber Co. The area is flat and alm devoid of brush, but the shelter of the planted pin enabled the robbers to make good their escape. T trees, 5½ years old from seed and 4½ years in the fie are now about 10 feet high.

* * *

Chilling on ice hastened the germination of the la edible seed of pines native to California in experime carried out by botanists of the University of Southe California. For the highest percentages of germi tion Torrey pine seed from the Torrey Pine Preser near La Jolla required 25 days of chilling and se of Digger and Coulter pines required 50 and 60 da respectively. Experiments with seed of the sing leaf piñon indicated that seed of this species germin best after 30 days on ice.

* * *

Visitors to the national parks again increased number last year, reports Horace M. Albright, direct of the National Park Service. In the 1930 travel yea ending September 30, the parks were visited by 2,81 618 persons. Yosemite and Mount Rainier Natio Parks had 458,566 and 265,620 visitors, respectively.

Foreign Notes

Something New in Forest Planting

By Bert R. Lexen, United States Forest Service

'he Norwegian forestry journal Skogbrukeren an-
nces the advent of a new forest planting machine,
announcement bearing the rather enthusiastic title
international planting method." The machine
n invention of the Norwegian forester Aksel Bak-
. Bakken some time ago conceived the idea of
ting forest tree seed in small squares of sod that
ld be set out in the field during the seedling stage
hout any particular reference to the planting sea-
. This idea has materialized as a machine that,
en fed with seed and with a suitable mixture of soil
moisture, automatically forms a soil briquet,
es a hole in it, drops in two or three seed, sprinkles
over the seed, and then gently presses the soil
er down. (The drawing accompanying the de-
iption suggests that the briquet is about 2 by 2
5 inches.) After this operation a claw lifts the
quet forward and dips it into a solution of paraffin,
ich serves to hold the briquet intact until it is
lly planted. The briquets can be stored almost
where in the open until a year after germination,
en they are ready to be set out on the planting
a. In one year the roots of some of the seedlings
wn by this method developed so far that they be-
to protrude from the sides of the briquet.

At present the machine can produce 16,000 briquets
an 8-hour day. With later improvements it is ex-
ted to increase this figure, although an output of
proximately one briquet every two seconds is as-
nding enough. Certainly, the method is a great
vance on the old form of ball planting.

In developing the mechanical features of the machine
kken enlisted the aid of a well-known Norwegian
chine designer, Birger Holm-Hansen. The first
chine was turned out in a German factory last
mmer. A company has been formed with an actual
pital of approximately $134,000 to develop the
ethod and set it out on the world market. Present
ans call for introducing it first in England and later
other countries.

The machine-made soil briquet promises to become
important factor in forest planting. In much of
r planting in the United States the difficulty of
ndling the briquets on the planting areas would be
nsiderable, because of their bulk and fragility; but
at one difficulty may be greatly overbalanced by
e many advantages of this method of planting.
his method prolongs the planting season almost in-
finitely, eliminates the expense of transplanting the seedlings and later cultivating them, reduces root disturbance to the minimum and thus tends to bring about better survival, gives the maximum opportunity for development of a good root system (something that is not always assured by present planting methods) and enhances the possibility of success in propagating some of the more delicate species and in planting on adverse sites.

Provincial Forest Services Created in Prairie Provinces of Canada

Manitoba, Saskatchewan, and Alberta each have a new provincial forest service, recently created in consequence of the transfer of responsibility for administration of natural resources from the Dominion Government to the provincial governments. Through this change the Dominion forest service has become primarily a research rather than an administrative organization. The new provincial foresters are H. I. Stevenson, E. H. Roberts, and T. F. Blefegen. All these men have had long experience as officers of the Dominion forest service in their respective Provinces.

Forest Management Enters Second Decade in Western Australia

In the year ending with June, 1930, forest improvement work in Western Australia for the first time covered an area greater than the forest area cut over during the year, the State's forests department reports. On 49,395 acres of indigenous forest, principally jarrah, measures were taken for the protection, development, and improvement of natural regrowth; from 44,700 acres, 29,382,233 cubic feet of timber was extracted. The year began the second decade of forest management in Western Australia. In the 1929 planting season the area of pine plantations was increased by 791 acres, bringing the total to 4,061 acres. Pinus radiata and Pinus pinaster again formed the main portion of the planting stock used; but 126 acres of experimental plantations were established with Pinus canariensis, P. palustris, P. longifolia, P. laricio, P. taeda, P. caribaea, P. jeffreyi, P. coulteri, P. banksiana, P. ponderosa, and other conifers. An increase of 39,000 pounds in exports of sandalwood oil brought the year's total to the record figure of 131,400 pounds. Termite investigations and a study of preservative treatment of fence posts were continued during the year, and a bulletin was published on air seasoning of jarrah flooring.

Australia Establishes Commonwealth Forestry Bureau

Establishment of a Commonwealth forestry bureau in Australia is provided for by a recent act of the Federal parliament. The bureau is to be under the charge of the inspector general of forests. Its powers and functions will include advising the territorial governments on all matters pertaining to the management of forests; managing forests placed under its control by the Governor General; establishing experiment stations for the study of silviculture, forest management, and forest protection; providing educational facilities for the training of professional foresters; establishing and awarding forestry scholarships; collecting and distributing forestry information; and publishing reports and bulletins dealing with forestry.

The same act establishes a "forestry fund" which the inspector general of forests, the secretary to the treasury, and the secretary to the department of home affairs will control as trustees. This provides for the administration of such gifts to the Commonwealth as that of £5,000 made in 1929 by Russell Grimwade, of Melbourne. Mr. Grimwade's gift sustains a traveling scholarship in forestry, tenable for one year, open to graduate foresters with two years' experience in the Commonwealth forestry service or that of one of the States.

Forest Fire Insurance in France

Mutual forest fire insurance organizations were founded in 1928 in three departments of the central plateau region of France, where considerable reforestation is under way and where the danger of serious fires is slight because of favorable climate and scattered distribution of woodlands. In 1929 these organizations joined in a regional association for reinsurance. Insurance is written principally on young stands and covers the value of the trees only. The maximum single risk is 230,000 francs. Contracts run for five years. Premium rates range from 0.5 to 2.5 per mille on broadleaf stands and from 0.5 to 1.2 per mille on conifers, according to age. If funds are available, rebates are paid to members who have taken special measures to protect their forests and who have had no fires.

* * *

Areas under teak in Java at present total 1,897,000 acres, reports Assistant Trade Commissioner Warren S. Lockwood, Batavia. Other forest reserves, including certain areas in need of reforestation, total 4,088,000 acres. Other forests, of which it is expected that part will be annexed to the forest reserve and part turned to agricultural use, cover 1,420,000 acres.

Twisted Fiber in Pinus Longifolia

After a 4-year interval H. G. Champion, silvicultu
of the Forest Research Institute of India, has ag
reported on an inspection of plots of Pinus longif
grown in Kumaon from selected seed in order to stu
the cause of twisted fiber (Mr. Champion's conc
sions from an earlier inspection were quoted on page
of the FOREST WORKER of January, 1928.) At
time of the recent inspection the plants were mos
13 and 14 years old and it was possible "to collect m
of the data at breast height instead of near grou
level, and so to bridge the gap that has hithe
existed between the seedling and the sapling and sm
pole stages." Mr. Champion's deductions from
1930 data, and the application he suggests, are
follows:

> The chief conclusion, which, it is ventured to sugge
> is established beyond possible further doubt, is th
> the production of twisted fiber is a character which
> inherited from one generation to the next, indepen
> ently of any influence which soil and treatment m
> exert.
>
> It can not be asserted that a 100 per cent twist
> parent crop will give a 100 per cent twisted seco
> rotation crop from natural regeneration, whether it
> protected from adverse external influences or not, b
> it can be stated already that about two-thirds at lea
> will be twisted beyond serviceability for timber, ev
> given that complete protection which experience h
> proved impossible in present practice. There are ind
> cations that the usual damage from trampling a
> burning may increase this percentage.
>
> The use of imported seed from a suitable source w
> give a crop at least to the sapling stage which is virt
> ally free of twist, even in localities where the origin
> crop is 100 per cent twisted.
>
> The use of seed from straight trees in localities
> which the percentage of twist is moderate or low w
> similarly give crops in which the percentage of twist
> stems will not exceed about 25 per cent, and may pe
> haps be comparable with the parent crop.
>
> The use of seed from straight trees growing among
> twisted crop is definitely preferable to that of se
> from twisted parent trees growing among a predom
> nantly straight crop, and may result in a new cro
> about 40 per cent twisted as compared with 60 p
> cent for the latter.
>
> Closely comparable results are obtained in three
> the four localities, demonstrating independence of so
> underlying rock, and aspect. (The fact that the four
> locality, Kaligadh, has given definitely lower percen
> ages of twisted stems with both types of seed used an
> is also the locality with the least twist in the existin
> crops is noteworthy and may be important, but unfo
> tunately the figures have not the same weight as tho
> from the other localities, being based on small numbe
> of measurements, obtaining no further support fro
> data of other years, and the seed used being fro
> supposedly comparable but actually different sources
>
> The results agree throughout with those obtained
> 1926 and 1923 and so derive additional reliabilit
> particularly where the numbers of trees now measure
> are small.
>
> The tentative conclusion is confirmed, which wa
> reached on the data available up to 1921, that lef
> handed twist in Pinus longifolia in Kumaon is of th

e of a Mendelian dominant character which has ıated independently in many localities, its extenbeing due to the long-continued selection of the hter trees for removal.

ore confidently even than in 1926, it must be ed that for all artificial regeneration work careful ion of seed is a matter of utmost importance. ould be preferable to import from Naini Tal, rata, or other similar localities all the seed red, and with the cheap motor transport now able this can not be ruled out as totally impracle. As, however, the bulk of the seed required probably still be obtained locally, the need of insistence on the use of seed from straight trees ear. The obvious source of seed is the main er fellings, and if it is still found that the fellings isually done too early in the season for the seed fertile (the valuable information that the cones safely be collected as soon as they are full sized ecember—*vide* S. H. Howard, Chir Seed Supply, Bull. No. 67—is still not generally utilized, it is ved), then, as has been found both necessary and ical in several other types of forest, the time of g must be altered.

making regeneration fellings in mature crops a good proportion of straight trees, the straight must be selected as seed bearers even at the fice of good spacing.

making regeneration fellings in mature crops a high proportion of twisted trees a very marked ovement may be looked for if the seed trees are ly straight. The proportion twisted in the secrotation may be half that in the first.

ne retention of unfit marked trees in shelterwood neration fellings, on the score of cost of felling, is ngly condemned as contrary to all the tenets of silviculture and in the face of the clear proofs available of the results on the regeneration. se trees have to be felled sooner or later, and it ld emphatically be sooner.

ne treatment of advance growth in areas brought r regeneration must be considered in the light of foregoing paragraphs, which show what may be cted. It should be examined for twist in any case, only retained if up to the standard probably nable with the given parent crop.

hile a good deal more evidence is still required, experience gained in the 14 years' course of these stigations all goes to indicate that the ordinary ıs of injury to which *chir* regeneration is subd—burning, browsing, trampling, etc.—are not ors of first importance in the development of ted fiber, though by causing distortion of the stem may exaggerate the defect already present.

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orest and Outdoors, the monthly magazine pubed by the Canadian Forestry Association, goes into 00 schools to be used in teaching conservation. schools the annual subscription price is $1, less ı cost. Prizes totaling $65, and 25 annual subptions, were recently awarded by the association rural school teachers for lesson plans based on erial in the magazine. Material from the maga is regularly reproduced by 450 newspaper editors Canada.

Yellow Poplar Withstands Extreme Cold in Ukraine

Yellow poplar has a good chance of successful introduction into southern Ukraine, foresters of the Vesselo-Bokovenkovska Dendrological Experiment Station concluded on the basis of the frost resistance which the tree exhibited at that station in the early months of 1929. The station is located at 48° 10′ north latitude in a dry prairie region in the southwest of the Union of Socialist Soviet Republics. Exotic trees and shrubs growing there passed through a very severe test in 1929, when temperatures as low as −35° C. were recorded. The yellow poplars, which were 21 years old or older, endured this ordeal without greater injury than freezing back of twigs of the previous year's growth to a distance of not more than 12 inches from the tips.

High Latitudes Temper Sun's Rays to the Unshaded Seedling

Discussing the danger to unshaded tree seedlings of death due to overheating at the soil surface, W. E. Hiley, of the Imperial Forestry Institute, Oxford University, has called attention as follows to an advantage enjoyed by Swedish silviculture:

> The cheapest method of regeneration, which frequently proves successful in Sweden, is to leave scattered mother trees, singly or in clumps, from which the surrounding almost bare areas may be naturally seeded. In Sweden they appear to have little trouble from high soil-surface temperatures and can adopt this method which in southern Germany would generally fail. We must remember, however, that the temperature of the surface soil under direct insolation is determined principally by the angle of incidence of the sun's rays. In Sweden, at a latitude of 60°, this can never be more than 38°, whereas in Quebec at a latitude of 45° to 50° it is very much higher; and I have observed in Quebec that on bare ground coniferous seedlings only succeed in establishing themselves on the north side of boulders and logs. This suggests that in Quebec methods of natural regeneration will have to follow the practice of southern Germany rather than Sweden.

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Among Canadian trees those to which the 1930 drought proved most disastrous were the willows and the Manitoba maple, with the poplars next, says the Canadian Forestry Association. White spruce, ash, and elm appeared to suffer very little. Caragana demonstrated exceptional ability to withstand adverse conditions.

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Plant-quarantine regulations in force in the Union of South Africa prohibit importation of Eucalyptus, acacia, or any conifers.

Personals

Henry Morgenthau, jr., son of the former United States ambassador to Turkey, has taken office as conservation commissioner of New York. Carl E. Ladd, director of extension at the New York State College of Agriculture, will serve temporarily as deputy commissioner during his sabbatical leave.

Lewis E. Staley is to serve as secretary of the Pennsylvania Department of Forests and Waters under Governor Gifford Pinchot. Before going to South Carolina, where he has served as State forester for the past two and one-half years, Mr. Staley was active in State forestry work in Pennsylvania for 21 years. He will be succeeded in South Carolina by H. A. Smith, who went from a position as district forester in Pennsylvania to that of assistant State forester of Florida.

Seth E. Gordon, for several years conservation director for the Izaak Walton League of America, has been elected president of the American Game Protective Association, succeeding the late Carlos Avery. Mr. Gordon was previously executive secretary of the Pennsylvania Board of Game Commissioners.

John W. Stephen, head of the department of silviculture, New York State College of Forestry, died January 2, 1930. Trained in forestry at the University of Michigan, Professor Stephen joined the faculty of the New York State College of Forestry at the time when it was first organized, in 1912. He was placed in charge of its department of silviculture in 1915, and served in that capacity continuously until the time of his death. Among many books and articles written by Professor Stephen were "Making Best Use of Idle Lands in New York," "Basket Willow Culture in New York," "Forest Conditions in Oneida County," and "Top-Lopping of Branches in Lumbering Conifers."

Alfred K. Chittenden, since 1914 director of the forestry department of the Michigan Agricultural College, died November 1, 1930. Professor Chittenden was a member of the first class graduated from the Yale School of Forestry, that of 1902. He served as a forester both in the United States Forest Service and in the Indian Service of the Department of the Interior. In connection with his educational work at the Michigan Agricultural College he enlarged the college nursery from a small beginning to its present capacity of 3,000,000 trees and developed the Dunbar Experiment Station, at Sault Ste. Marie. His writings include, together with many articles for the quarterly bulletin of the Michigan Agricultural Experiment Station, United States Forest Service bulletins entitled "Forest Conditions of Northern New Hampshire" and "The Red Gum," and Michigan State College bulletins entitled "Forest Planting in Michigan," "Improvement of the Farm Woodlot," and "Christmas Tree tations."

The Timber Conservation Board, appointed b President to find out the fundamental factors re sible for present overproduction of lumber, was timber resources, and instability of forest indu and make recommendations as to remedies for conditions, has the following membership: Secr of Commerce Lamont (chairman); Secretary of culture Hyde; Secretary of the Interior Wi George D. Pratt, president American Forestry Ass tion; John C. Merriam, president Carnegie Institu John W. Blodgett, chairman of the board of Blo Co. (Ltd.); D. C. Everest, former president Ame Paper and Pulp Association; Carl Raymond president Union Pacific Railway Co.; Charles Lat Pack, president American Tree Association; Joh Kirby, former president National Lumber M facturers' Association; W. M. Ritter, president M. Ritter Lumber Co.; L. J. Taber, master, tional Grange; and Paul G. Redington, president o Society of American Foresters and director of United States Biological Survey. The board's a ory committee is as follows: R. Y. Stuart, U States Forest Service (chairman); E. T. Allen, Wes Forestry and Conservation Association; Hugh Baker, New York State College of Forestry; S Dana, University of Michigan; Fred H. Fairchild, University; Henry S. Graves, Yale University; W Greeley, West Coast Lumbermen's Association; Ch H. Herty, New York City; D. T. Mason, Portl Oreg.; George N. Ostrander, Glens Falls, N. Y.; Jos Hyde Pratt, Chapel Hill, N. C.; George W. Sisson, Racquette River Paper Co.; J. W. Watzek, jr., C sett-Watzek-Gates, Chicago; Wilson Compton, tional Lumber Manufacturers Association; Willian Cooper, Bureau of Foreign and Domestic Comme Charles J. Rhoads, Office of Indian Affairs; Lair Bell, Fisher, Boyden, Bell & Marshall, Chicago; J. G. McGowin, W. T. Smith Lumber Co.

S. D. Marckworth is leaving his position as profe of forestry in the Louisiana State University to acc a similar position in the Georgia State College of A culture.

F. B. Trenk, for more than six years extension fore for Maryland, has accepted appointment as extens forester for his native State of Wisconsin, succee Frederick C. Wilson. Mr. Trenk received the M degree in forestry from the Iowa State College in 1 The new extension forester for Maryland is Rich Kilbourne, a 1926 graduate of the Yale School of F estry who has had three and one-half years' experie with the Tennessee division of forestry.

oward Hopkins has reported at the Washington, C., office of the United States Forest Service as st inspector in the Branch of Forest Management. Hopkins entered the Forest Service in 1923, the of his graduation from the Yale School of Forestry. r several years' experience on the White River ional Forest, Colo., he was transferred to the Chip- a National Forest, Minn., as forest examiner, and e January, 1928, he has been supervisor of the pewa.

illiam Maughan has resigned as instructor in ied forestry, Yale School of Forestry, to go to e University, Durham, N. C., as assistant director Duke Forest and assistant professor of forestry. le at Yale, where he received the M. F. degree in 9, Mr. Maughan assisted in reorganizing the Eli itney Forest as a demonstration area and became thor with Professor Hawley of the bulletin, The Whitney Forest—A Demonstration of Forestry ctice. He is the author also of the Yale bulletin, Control of the White Pine Weevil on the Eli itney Forest. For three years following his grad- ion with the B. S. degree in forestry from the versity of Minnesota he served as instructor in st engineering in the New York State College of estry.

eorge M. Gowan, supervisor of the Trinity National est, Calif., has been transferred to the California est Experiment Station as project leader in fire estigative studies. In this work he is assisted by n Curry, formerly deputy State forester of Maryland, A. A. Brown, formerly assistant supervisor of the ferson National Forest, Mont.

Nils Fornander, a forester of Karlstadt, Sweden, is ring the United States in order to familiarize himself h American logging methods. Mr. Fornander is ployed by the Uddeholm Co., which has 600,000 es of timberland in the Province of Varmland under stained-yield management, the annual cut averaging out 210,000,000 board feet.

C. M. Granger, director of the survey of forest re- urces and requirements which the United States rest Service has under way, is now stationed in ashington, D. C.

Nelson C. Brown, professor of wood utilization in the ew York State College of Forestry, has gone on leave r a year to accept a temporary position with the nited States Tariff Commission. He will make a udy of lumber production costs in the Douglas fir gion of the Northwest and in the southern pine region.

J. Bernhard Melin, assistant meteorologist of the nited States Weather Bureau formerly stationed at an Jose, Calif., has been made fire weather specialist r the State of Washington, succeeding the late eorge W. Alexander.

Richard P. Imes, at one time supervisor of the Harney National Forest, S. Dak., has been appointed register of the land office at Billings, Mont.

Felipe M. Salvoza, a member of the 1928 class of the New York State College of Forestry who has received the master's and doctor's degrees from Harvard University, has been appointed instructor and lecturer in dendrology and botany in the Forest School, University of the Philippines.

Thomas E. Carpenter, for the past three years employed as landscape architect and forester at Letchworth Park, near Castile, N. Y., has been appointed as landscape architect in the National Park Service with headquarters at San Francisco.

Ben W. Rowland, formerly employed as a research chemist by the Goodyear Tire & Rubber Co., is now research associate and associate professor of colloidal chemistry in the Institute of Paper Chemistry, Lawrence College, Appleton, Wis. His appointment resulted from the establishment of a research fellowship by the Stein-Hall organization.

Ernest P. Leavitt, assistant superintendent of Yosemite National Park, has been appointed superintendent of Hawaii National Park. Superintendent Thomas J. Allen has been transferred from Hawaii to Zion National Park.

F. I. Righter, who has been acting professor of forest management at Cornell University during the absence of C. H. Guise, is soon to assume the duties of a geneticist at the Eddy Tree Breeding Station, Placerville, Calif.

W. L. Neubrech, a 1927 graduate of the New York State College of Forestry, has resigned as assistant in forestry, Purdue University, to become assistant business specialist with the lumber division, United States Department of Commerce. He is succeeded by Roy Brundage, a fellow alumnus of the Syracuse college.

C. G. Strickland, California forest inspector in charge of the Mount Shasta district, has been made deputy State forester, with headquarters in Sacramento. His successor is E. P. Biggs, formerly inspector in charge of the middle Sierra district, of which Earl T. Barron will now have charge in addition to his duties as inspector of fire control throughout the State. Cecil Metcalf, formerly State forest ranger in Tulare County, has been made inspector in charge of fire prevention and suppression in the San Joaquin district.

Elwin E. Harris has joined the derived products section of the Forest Products Laboratory, to engage in an investigation of lignin. Doctor Harris, who received both the master's and the doctor's degree from the University of Minnesota, has served for the past seven years as professor of organic chemistry in the University of North Dakota.

Gilbert H. Wiggin has been appointed forester in charge of the North Dakota State Forest Nursery, at Bottineau. Mr. Wiggin is a forestry graduate of the University of Minnesota and has had experience in forest research at the State forest experiment station at Cloquet, Minn. He succeeds Sidney S. Burton, now forester in charge of the Southern Great Plains shelterbelt project of the Federal agricultural field station at Woodward, Okla.

Fay G. Clark, for the past 10 years a member of the forestry faculty of the University of Montana, has left that post for a year to study and teach at the Iowa Agricultural College.

Floyd Otter, junior forester on the Lolo National Forest, Mont., has resigned to accept a position at the University of Idaho Forest School, where he will teach silviculture and work for a master's degree.

W. F. Sellers, of the Federal gypsy-moth labora at Melrose Highlands, Mass., sailed in October Europe. He will be stationed at the temporary laboratory at Budapest, Hungary, and will be a ciated with P. B. Dowden in the study and the troduction into the New England States of Europ parasites of the gypsy, brown-tail, and satin moth

Charles Geltz, recently an instructor in the Penn vania State Forest School, is now teaching forestr Purdue University.

C. N. Mease has been transferred from the pos chief forest warden and district game warden in trict 1, North Carolina, and placed in charge of western North Carolina game refuges.

Joseph B. Pike, jr., a recent graduate of the School of Forestry, is now district forester of the Pi mont section, Virginia.

Bibliography

Timber Growing and Logging and Turpentining Practices in the Southern Pine Region

By C. F. Evans, United States Forest Service

The latest contribution to the series of Forest Service bulletins on timber growing and logging practice in the various forest regions of the United States is a 111-page bulletin[2] by R. D. Forbes entitled "Timber Growing and Logging and Turpentining Practices in the Southern Pine Region." The purpose of this publication, as stated in its introduction, is "to bring together the gist of what has thus far been learned about the growing of timber" in the South for the benefit of southern timberland owners and others who may be interested in the subject. The guarded claims made in the introduction as to the applicability of the measures advocated in the bulletin are disarming to the critic. Indeed, the presentation seems overmodest in that it commends the publication to landowners only "as a starting point." I believe that it will be accepted rightly as much more than that.

The scope of this bulletin imposed an extremely difficult task upon the author. The southern pine region from Maryland to Texas is by no means homogeneous. Methods that are quite suitable in one part of this territory may not be applicable in another part. This inherent difficulty and the lack of definite information concerning certain elements of the timber-growing business are met in many instances in the text by giv a range of figures or a choice of methods, the idea be that any local application will fall somewhere wit the range. The author recognizes frankly that t will not satisfy the landowner who wants detailed vice adapted to the "individual needs of particu holdings." The point deserves further emphasis.

As in other publications of the same series, the r ommended measures are divided into two groups, the basis of intensity of management—"minimum measures, which "represent broadly the lowest c that must be incurred to keep forest land reasonab productive," and "desirable forestry practice," wh of course costs more. It seems unfortunate that t distinction had to be made. If the arrangement material in the text appears clumsy and confusing the reader, the blame can be placed on this concepti

A brief but, in general, adequate description is giv of the habits of growth of the four main species southern pine—longleaf, slash, shortleaf, and loblol It is to be regretted that one of the most importa problems concerning longleaf pine, the question as whether under certain conditions fire is useful in c taining reproduction, is dismissed with a single u satisfying sentence. If controlled burning of rou areas prior to seed fall helps to establish longleaf repr duction, as is stated by one of the authorities cited in t list of references, the sooner we know it the bett Perhaps the author had not reached a definite concl sion on this subject.

The 26 pages given to fire protection contain ma valuable suggestions. The author's general concepti of this job is sound, although obviously some details his recommendations can not be applied uniform roughout the region. Here again the landowner ay need to seek expert advice adapted to the par- cular needs of his locality and holdings. Not many wners will undertake the expense involved in the slash- sposal measures advocated or in the intensive system firebreaks indicated for slash-covered areas. It would em that in most cases the same amount of money ould buy more protection if invested in detection, trol, and suppression. I doubt that firebreaks will needed as a rule for isolated farm woodlands, par- cularly for 40-acre tracts. Where such tracts are rrounded by cultivated land, very little cash outlay ill be needed for their protection. In many cases they ill be safe if the owner merely refrains from firing em himself.

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[2] U. S. Department of Agriculture Technical Bulletin No. 204. Copies may be obtained free of charge, as long as the supply lasts, from the Office of Information, U. S. Department of Agriculture, Washington, D. C.

In respect to the matter of raking trees in turpentine rchards the bulletin is somewhat behind the present roved practice. Members of State forestry depart- ents and landowners within intensively protected reas in the Southeast will not agree that raking is ither necessary or desirable. The elimination of aking has proved to be a most effective fire-prevention easure, and as a result owners of protected lands Georgia and Florida are drawing their turpentine eases so as to prohibit raking. The rapid develop- ent of this practice has come, of course, only within he last year or two, and it is still true that raking is he general custom. The Florida Forest Service has onvincing figures to prove that organized protection lus an adequate system of firebreaks is less expensive nd more effective than raking.

The part of the bulletin that deals with seed trees, methods of bringing about natural regeneration, and he desirability of obtaining fully stocked stands impresses me most favorably. Here the author has brought together some information that will be extremely valuable. It may in time develop that too much reliance has been placed on seed trees in the reproduction of longleaf pine and that, after all, planting is the cheapest way (the author recognizes this possibility); but for the present the author's views on this subject seem well balanced.

The turpentining practices recommended will no doubt prove very helpful. It is not clear whether the author has in mind naval stores or wood products as the primary crop. At present the landowners in the eastern part of the longleaf and slash pine region undoubtedly are thinking of naval stores as the primary crop. Detailed management plans can not be made until the objective is defined. This applies with special force to thinning methods. In this connection the expressed doubt as to the importance of thinning slash pine stands (p. 93) is surprising. Owners of protected slash pine stands in the Southeast are struggling with the problem of how to thin for best results and with the least expense. They and their technical advisers are convinced that thinnings are necessary. It is estimated that more than 10,000 acres of young slash pine was thinned in south Georgia in 1930. On many protected areas in this region a few years' protection from fire has resulted in an oversupply of slash pine reproduction, and there appears to be ample proof that partial stagnation follows if such stands are not thinned. The "wrecked" stands illustrated on pages 59 and 60, if protected for 10 years, will require thinning.

Many landowners and foresters will not share the author's gloomy view of the future of much of the second-growth land in the South. Undoubtedly it has been badly treated and the devastated portion (10,000,000 acres) will not recover without artificial reforestation. But experience in slash pine stands does not support the inference (p. 100) that planting will be needed on lands without advance reproduction if all trees suitable for seed production have already been turpentined—which, the author observes, is an almost universal condition in the second-growth stands of the eastern naval stores territory.

A few minor errors in expression are noted. Firebreaks are called "fire lines." "Middle buster" appears as "middle burster." In the introduction (p. 2, line 27) the word "reforestation" is used in a provincial sense to cover all phases of forest practice. In line 7, paragraph 2, page 50, shortleaf pine is referred to as longleaf pine.

It would be impossible in a short review to indicate the full scope of this publication. The bulletin contains a wealth of information and valuable suggestions. It is an outstanding contribution, too ambitious in its conception but offering full proof of the assertion in the introduction that "we know enough now about growing timber in the southern pineries to go right ahead."

A Census of Forest Investigations in the Northeast

A Census of Forest Investigations Under Way in New England and New York, recently compiled by the Northeastern Forest Experiment Station, lists 292 investigative projects. According to investigative field the following distribution is shown: Forest management, 82; forest protection, 56; forestation, 51; forest mensuration, 41; forest ecology, 28; forest utilization, 21; forest economics, 5. Classified according to the agency responsible, projects listed fall into groups as follows: Forest schools, 107; private companies, 52; agricultural colleges and experiment stations, 28; other colleges and universities, 24; the United States Forest Service, 25; other Federal bureaus, 12; State forestry organizations, 21; botanic gardens and other scientific institutions, 11. Descriptions of the 292 projects form a 125-page mimeographed book. So long as the supply lasts, requests for this publication will be filled without charge by the Director, Northeastern Forest Experiment Station, Amherst, Mass.

Recent Bulletins on Selective Logging

By A. B. Recknagel, Cornell University

Among the many recent publications on selective logging, the work of Raphael Zon and R. D. Garver and of W. W. Ashe is outstanding. Ashe undoubtedly was the first American forester to write on the subject (cf. his article, "Small Timber and Logging Costs from Profit Standpoint," in the Lumber Trade Journal, November 1, 1914); Zon and Garver were the first to make a full-length study of this important problem. An advance report on the study by Zon and Garver was published in 1927 by the Northern Hemlock and Hardwood Manufacturers' Association of Oshkosh, Wis., under the title "Selective Logging in the Northern Hardwoods of the Lake States." The final report appeared in 1930 as Technical Bulletin 164 of the United States Department of Agriculture.

Zon's and Garver's outstanding conclusions are as follows: (1) Logging costs decrease with increase in the size of the log; (2) overrun is larger in small than in large logs; (3) milling costs decrease with increase in the size of the log; (4) lumber in large logs is of higher grades; (5) a tree must be at least 12 inches in diameter at breast height if the lumber from it is to be worth more than the cost of production; (6) the greatest profit per acre occurs when only trees 12 inches or larger in diameter at breast height are cut.

An important difference between the advance report and the final bulletin is that in the latter the discussion of relative logging costs and values is based upon tree diameters, not log diameters.

Ashe's most recent bulletin on the subject of selective logging is entitled "Profit or Loss in Cutting Shortleaf and Loblolly Pines in Alabama."[3] His analysis regards the tree as the unit. As he says, "while it is customary for the operator to think in terms of logs, so long as this is done it is not possible to reach any conclusion as to what tree it is profitable to cut."

Ashe's findings "show, roughly, that for a band sawmill operation it costs, including stumpage, twice as much to produce lumber from trees 9 inches in diameter as from trees 25 inches in diameter; that for a circular sawmill operation it costs 65 per cent more to produce lumber from 9-inch trees than from 25-inch trees." They show further that for average-aged second-growth stands the lumber which is sawed from 25-inch trees has an f. o. b. value nearly twice that of lumber sawed from 9-inch trees.

A significant feature of Ashe's logging and mill-cost bulletin is the figures showing the returns per 1,000 feet of lumber that can be realized by cutting to different diameters. These figures show that the maximum returns per 1,000 feet are obtained by leaving all trees under 18 inches in diameter at breast height. In the operations covered by Ashe's study the maximu return per 1,000 feet was $7.67. Such a return mak selection cuttings at frequent intervals profitable i spite of the high cost of railroad construction and banc mill operation. The adoption of such a diameter limi therefore, tends to prevent abandonment or neglect (cut-over land by private owners.

While selective logging alone does not constitute goo silviculture, as these authors point out, it is an impoi tant component; it brings in the greatest returns i proportion to volume removed, allows of an early secon cut, saves the small trees, and largely solves the small log problem.

Other papers of recent date which should be note at this time as evidence of widespread interest in th subject of selective logging are:

1. Selective Logging and its Application in the Douglas Fir Region, by D. T. Mason, in the Timberman, October, 1929.
2. Small Trees Wasteful to Cut for Saw Timber, by W. W. Ashe, United States Department of Agriculture Leaflet 55, January, 1930.
3. The Effect of Tree Sizes on Western Yellow Pine Lumber Values and Production Costs, by W. H. Gibbons, H. M. Johnson, and H. R. Spelman, in the Timberman, 1929–30.
4. The Tree That Does Not Yield a Profit, by W. W. Ashe, in the Scientific Monthly, October, 1930.
5. Selective Logging versus Clear Cutting in Shortleaf Pine, by R. D. Garver, in the Southern Lumberman, October 15, 1930.

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[3] Bulletin No. 2, Alabama Commission of Forestry. Pp. 64. Montgomery, Ala., 1928.

Forestation with Poplars in France

Reporting on a visit to France in the summer of 1930 A. B. Stout writes in the December Journal of the New York Botanical Garden on the use of poplar for forest planting in that country. Doctor Stout's observations were made in the region about Noyon to the northwest of Paris and over a considerable area along the Ourcq and Marne Rivers to the northeast of Paris. "At the present time," he states, "the forestry efforts with poplars are more extensively developed in France than in any other country. * * * The principal poplars grown in France for their timber are evidently of three types, known as "régénéré," "angulata," and "peuplier à écorce noire" (also called "peuplier de Caroline"). * * * In making forestation plantings in France, the rule is to use 3-year-old trees that have been grown from cuttings in nursery culture. The trees are frequently 9 feet tall when planted and they make very little growth the first year after the transplanting. It is said that younger trees or cuttings do not succeed. * * * From estimates of yield supplied to the author, it appears that a tree crop is frequently harvested at the age of about 25 years, at which time a yield of 40 or even 50 cords per acre may be obtained. * * * The poplars in France appear to be remarkably free from fungous diseases and insect pests."

ndex Published for Society of American Foresters Organs

Completion by a committee of the Appalachian ction, Society of American Foresters, of a heavy sk undertaken by the section three years ago has sulted in publication of a cumulative index for the oceedings of the Society of American Foresters, lumes 1–11 (May, 1905–October, 1916); the Fores- y Quarterly, volumes 1–14 (October, 1902–December, 16); and the Journal of Forestry, volumes 15–27 anuary, 1917–December, 1929). The committee at prepared the index consisted of Clarence F. orstian (chairman), Jesse H. Buell, and Verne Rhoades. opies of this printed index of 111 pages are being stributed at a charge of $1 each by the Society of merican Foresters, Hill Building, Seventeenth and Streets NW., Washington, D. C.

Douglas Fir Yields

By **Francis X. Schumacher**, United States Forest Service

What is undoubtedly the most complete analysis of e growth of fully stocked stands that has been made r a single timber species in the United States has ecently been published by the Forest Service as a ulletin[4] entitled "The Yield of Douglas Fir in the acific Northwest," by R. E. McArdle and Walter eyer.

The yield tables are based upon measurements of ,049 sample plots having an aggregate area of 1,371 cres; the volume tables were prepared from values of ore than 1,900 trees. Most yield tables heretofore ublished in this country have been constructed from ess than one-tenth this quantity of data. This in tself will undoubtedly establish in the minds of foresters nd timbermen a great degree of confidence in the work. But the authors have gone further. Supplementary urveys were made to test the relationship of actual to ormal stands. These included the running of 62 miles of very detailed strip surveys. The outcome of this part of the work, surprising to one unfamiliar with the region, was the disclosure that over extensive areas actual stand values are approximately 80 per cent of the normal yield table values.

Douglas fir seems to be more variable in its stand characteristics than any other timber species in this country. The University of California has published, within the last few months, yield tables for Douglas fir in that State. Although the growth of the California stands is significantly different from that of the stands in Oregon and Washington, it is interesting to note, these two studies have shown about the same variation of individual stands from normal subregional values for age and site. Following is the comparison of the variations, expressed in percentage of the standard error of estimate:

	California	Oregon-Washington
Basal area	16.4	14.3
Number of trees	27.0	24.6
Cubic volume	16.3	16.3
Volume in board measure	20.4	20.8

A New Fire Control Bulletin

By **Howard R. Flint**, United States Forest Service

"The Determination of Hour Control for Adequate Fire Protection in the Major Cover Types of the California Pine Region" is the title of a United States Forest Service bulletin[5] by S. B. Show, regional forester at San Francisco, and E. I. Kotok, director of the California Forest Experiment Station. The bulletin is worthy of study by publicly employed foresters engaged in the administration and financing of large fire-control organizations. The authors attempt, by statistical methods, to establish for each cover type considered the speed of action necessary to limit the area burned over by fires in one year to a maximum agreed upon as permissible for the type. Through the determination of this speed factor it is hoped to bring about an equitable distribution of fire-control funds according to cover type.

Many experienced foresters will question the essential character and importance of the thesis of this paper, set forth in the introductory statement as follows: "Successful fire protection on the national forests or elsewhere requires the solution of four major questions. These are: (1) A determination and statement of a specific objective; (2) determination of the speed or hour control necessary in attacking fires in order to hold burned acreage to the accepted objective; (3) determination of the size and distribution of man power and of fire-protection improvements required to attain the needed hour control; (4) the methods, technic, and training needed to use most effectively the man power and equipment after its arrival at the fire." Rather oddly, the authors mention on page 6 that they have omitted from calculation two national forests in the California pine region, having a total area of 3,000,000 acres, on which the fire-control objective specified by them has already been consistently and cheaply attained. Success in these cases appears to have been fully achieved without any consideration having been given to at least the first two of the alleged major requirements for its attainment.

The statement on page 2 that for timbered types the fire-control objective, in terms of the maximum proportion of area that may permissibly be burned over in a year, "is determined from the length of timber rotations in the region and the loss which can be endured without disrupting sustained-yield management plans," will probably be far from reassuring or satisfactory to many thoughtful foresters and conservationists.

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[4] U. S. Department of Agriculture Technical Bulletin No. 201. Copies may be obtained free of charge, as long as the supply lasts, from the Office of Information, U. S. Department of Agriculture, Washington, D. C.

[5] U. S. Department of Agriculture Technical Bulletin No. 209. Copies may be obtained free of charge, as long as the supply lasts, from the Office of Information, U. S. Department of Agriculture, Washington, D. C.

The analyses of data and the discussions are of the high standard one might expect from these two authors. There should be many critical readers of the bulletin among foresters and fire-control men.

A School Leaflet on Tree and Shrub Flowers

By W. A. Dayton, United States Forest Service

An attractively garbed and phrased booklet [6] published by Cornell University under the title "The Flowers of Woody Plants" depicts the inflorescences of native and naturalized woody plants as interesting, profitable, and esthetically valuable objects of study for children. A rather detailed description is given in popular form of the morphology, phenology, and pollenation of the flowers of about a score of familiar trees and shrubs, by seasons. There are 23 half-tone figures of woody plants in bloom, in addition to 4 full-page photographs (including that on the cover, of dogwood in full blossom), and 130 line drawings (illustrating 129 species), most of which are small and compact but very satisfactory. There is also a brief bibliography and an elaborate table of 32 important trees, shrubs, and woody vines, showing their ecology, morphology of both mature plant and seedling, phenology, wood characteristics, enemies, and uses.

Cover Type and Fire Control

By J. A. Mitchell, United States Forest Service

Recognizing cover type as "an element of basic importance in fire control," S. B. Show and E. I. Kotok present an analysis of the fire problem from that angle in a bulletin entitled "Cover Type and Fire Control in the National Forests of Northern California." [7] Although the bulletin deals with a specific region, the principles evolved and the methods used in developing the data are of general interest. In the words of the authors, "the study aims to distinguish the occurrence and behavior of fire in the major cover types as a basis for fire control." Wholly empirical, the study reveals distinct differences between the major cover types in regard to characteristics that affect the occurrence and behavior of fires.

As the authors point out, the occurrence and b havior of fires depend on the character, quantity, ar condition of the fuels present, all of which are large determined by type and the climatic conditions which type itself is an expression. Thus cover typ furnishes an index of the risk of fires starting, seaso of occurrence of fires, kind of fire to be expecte probable rate of spread, difficulty of control, cost suppression, etc.

Although no final mathematical expression of th differences between types in these respects is arrive at, tentative figures are presented which serve to indicate the relative hazard prevailing. Attention i called to the inadequacy of present protective effor in certain important types and to various ways i which the situation can be improved. For example knowledge of the preponderance of fires in certai types serves as a guide to the better allocation of me and protection improvements, and data on the seasona distribution of fires by type indicate the proper perio of employment of fire guards and smokechasers. Simi larly, information as to rate of spread and difficulty o control furnishes a valuable guide in determining th "hour control" and the size of suppression crew needed in each type to keep area burned withi standard limits. Records indicating the distributio of man-caused fires by type, also, provide a guide t the proper application of measures designed to prevent fires from starting.

While by no means exhausting the subject of cover type and its relation to fire control, this bulletin is a distinct contribution to forest protection literature and indicates the possibilities of further research along this and similar lines.

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Report of the Forester, June 30, 1930.

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Announcements

Annual Meeting of National Conference on State Parks

The eleventh annual meeting of the National Conference on State parks will be held May 27–28 in St. Louis. Arrangements have been made for a 1-day trip to one of Missouri's principal State parks following the meeting and for an alternative 3-day field trip into the Ozark region.

American Forestry Association Meets at Asheville

The American Forestry Association and the North Carolina Forestry Association will meet June 3, 4, and 5 at Asheville, N. C. Headquarters will be at the Grove Park Inn. Programs of talks and discussions will be supplemented with a tour of the Biltmore Fore a trip to the top of Mount Pisgah, and a visit to a lo rayon plant.

Florida Commercial Forestry Conferen

A Florida commercial forestry conference will held at Marianna, Fla., April 17–18. The Flori Chamber of Commerce, the Florida Forestry Assoc tion, and the Florida Forest Service are cooperating arrangements for the conference, with assistance fr the United States Chamber of Commerce. The p gram will cover the same general field as commerc forestry conferences recently held in several otl States. Particular stress will be laid on the possibilit Florida offers for pulp and paper manufacture and matters relating to forest taxation.

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State Forestry

Arkansas Enacts Forestry Measure

n act of the Arkansas Legislature approved in March vides for the establishment of a State forestry com- sion consisting of the dean of the College of Agricul- of the University of Arkansas, the State commis- er of mines, manufactures, and agriculture, and three nbers appointed by the governor. The act provides he appointment of a technically trained State forest- nd for cooperation with the Federal Government and Arkansas College of Agriculture in preventing and pressing forest fires and in gathering and dissemi- ng information concerning the growth, utilization, renewal of forests.

he legislature adjourned without appropriating any ds for the use of the forestry commission.

Tractor Works Fast on Los Angeles County Fire Line

tractor owned by Los Angeles County, Calif., ved extremely useful in a fire-suppression job de- bed by L. S. Percey, of the county forestry depart- t. The fire occurred last November, starting in tura County and burning into Los Angeles County. wing to the rapid advance of the fire, it was decided ut a fire line and back fire. Forty men were hastily uited and were put to work cutting a fire line 20 wide. After four hours' work the fire line was y one-half mile long. At this juncture a county stry department tractor equipped with back fillers lights arrived at the fire. The tractor first opened old mountain road to admit waiting tank trucks the scene of action. It was now dark, but the ctor was put to work on the fire line, relieving the to begin back-firing. In four hours' time the ctor had cut 3 miles of fire line 20 to 40 feet wide— b that would have required the efforts of 200 men. While this was going on, wherever possible the tank cks were following up the back-fire crews and "dous- " the last glowing embers along the fire line.

ater in the night the tractor was used to fell and y burning snags. The following morning it was d to "cold trail" 1 mile of hot line, which it finished about 30 minutes. Several days later, on another fire that burned from Ventura County into Los Angeles County, the tractor was used to "hit" the burning line, and successfully cold-trailed it. In this enterprise the tractor was backed up with a tank truck.

The Los Angeles County Forestry Department is now preparing to equip a tractor with a high-pressure pump and tanks to carry 500 gallons of water. This equipment will be used on locations where tank trucks can not be taken. The tractor will be used ordinarily on improvement work, but can be converted into fire apparatus in less than one hour.

South Carolina Commercial Forestry Conference

Unified effort toward the development of commercial forestry in South Carolina was the purpose of a meeting at Columbia, on January 21 and 22, that brought together representatives of the State's commercial, industrial, agricultural, educational, and recreational interests. Plans for the meeting had been worked out by a general committee headed by L. I. Guion, of Lugoff, S. C., with assistance from the United States Chamber of Commerce. In a preparatory statement issued in December the Chamber of Commerce said:

> This is the first conference of its kind to be held in South Carolina and augurs well to bring about new support in the conservation of her forest resources, which annually bring in over $24,000,000 for lumber products and in excess of $10,000,000 for salaries and wages. It is surprising to note that whereas 67 per cent of all the forests of the United States needing protection are safeguarded from fire by some form of organization, South Carolina is just launching forth in this activity and has only 2 per cent of its forests protected.

Thirty speakers discussed the various relationships through which forestry contributes or can contribute to the welfare of the State and ways in which this contribution can be amplified and perpetuated.

Resolutions adopted by the conference request increased State appropriations for forest-protection activities, Federal studies of erosion control in the Appalachian region, Federal support for forest research in the Coastal Plain region, a Federal study of wood waste in the State, and institution of a course in game production in the Clemson Agricultural College. Action was taken toward forming a State forestry association, the working out of a plan of organization being entrusted to Mr. Guion and a committee of five to be named by him.

South the Greatest Loser from Forest Fires

Of the 589,800,000 acres of land in the United States needing systematic protection from fire, 38 per cent lies in the Southern States; of the 190,900,000 acres of land that needs fire protection but is not protected, the South contains 86 per cent. The Southern States as here referred to are Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Louisiana, Mississippi, Texas, Arkansas, and Oklahoma. The figures quoted are based on reports by State foresters to the United States Forest Service for the calendar year 1929 and national forest statistics for that year. They do not cover national parks or Indian lands, and are limited to continental United States exclusive of Alaska.

In 1926 fire protection was provided for 64 per cent of the area in the United States classed as needing such protection; by 1929 the proportion had increased to 68 per cent. In the South the corresponding increase was from 24 per cent to 27 per cent.

Not only is fire protection less widespread in the South but southern forest areas are more subject to burning than those elsewhere in the United States. Reports for 1929 indicate that in the United States as a whole 1.2 per cent of the land under protection in that year was burned; for the South the corresponding percentage was 2.8. The percentage of land with and without protection reported as burned over during 1929 was 7.8 for the United States, 19.1 for the South. Of all the land in the United States, protected and unprotected, reported as being burned over during the year, 92.6 per cent was southern land.

Forest fires reported as occurring on protected areas in 1929 numbered 44,100 for the United States as a whole, 16,000 for the South. The total number of forest fires reported for the year was 134,900 for the United States, 105,200 for the South. Damage estimates reported to the Forest Service would indicate that in 1929 the forest fire losses borne by the South made up 88 per cent of the country's total.

⁂

Appropriation acts approved by Governor Roosevelt in January provided $18,000 to be used by the New York Conservation Department in gypsy-moth control and forest-nursery work. It was arranged to employ 15 men immediately as an addition to the forces endeavoring to prevent the gypsy moth from becoming established in New York. Between 15 and 20 additional men were to be put to work in the forest nurseries making racks for seed beds.

State Forestry Appropriations for 1

Money appropriated for forestry purposes by States, Porto Rico, and Hawaii for the year en June 30, 1930, amounted to $7,297,935. This includes some money received through the sale of est products and nursery stock; it does not inc the balance of about $2,000,000 remaining at the o ing of the year from New York's 1924 bond issu purchase of forest land, nor does it include $155 that was allotted for fire suppression within the by the Minnesota State Board of Relief.

Amounts set aside by 38 States for forest fire tection totaled $2,555,329. This represents an crease of nearly 50 per cent over the State fire-pro tion appropriations for the year ending June 30, 1 Appropriations for 1930 covering other phases of S forestry work likewise showed substantial incre over those for 1928. For the purchase and mai nance of State forests $2,308,801 was appropriated 1930, as compared with $1,489,086 for 1928, an incr of 55 per cent. Funds set up for protecting for from insects and disease in 1930 amounted to $362, an increase of 25 per cent. The most striking de opment is that indicated by the 1930 State appro tions for nurseries and reforestation work, w amounted to $1,106,711 and represented an incr of more than 100 per cent.

States appropriating funds to be used in 193 protecting forests from disease or insects or numbered 12, whereas only 4 had made funds avail for that purpose in 1928. Nursery and reforesta appropriations for 1930 were made by 38 States, P Rico, and Hawaii, the number of States providing f for such work being increased by 4 over the 1928 t

The largest forestry appropriations made by vidual States for 1930 were those of New York Pennsylvania. Aside from the New York bond funds referred to in the foregoing these were ne identical, $1,531,582 for New York and $1,528,86 Pennsylvania. Ten States appropriated more $200,000 each.

Man-Caused Fires Cost North Carol $11 Each

Forest fires covered 3.04 per cent of the area u protection in North Carolina in 1930. This drou year record is not so good as those of the favor years 1928 and 1929 and is a shade in excess of corresponding figure for 1927. It is better, howe than the records of the four years 1923–1926.

Last year 45 North Carolina counties cooper with the State in forest fire protection work and protective system covered 10,025,370 acres, the lar area protected in any year since this work was in urated by the State. The number of fires was 3, largest recorded in the 8-year period for which the te forest service has records. Fires attributed to tning numbered 32. Fire-control expenditures in cooperating counties amounted to $39,709. istant Forester Charles H. Flory points out that h careless act resulting in a forest fire in the State ing 1930 cost the public an average of $11.

rovisions of Clarke-McNary Law Extended to Porto Rico and Hawaii

congressional resolution approved March 3 extends Porto Rico the provisions of sections 1, 2, 6, and 7 the Clarke-McNary law. This will permit the acsition of lands in Porto Rico, by purchase or gift, national forest purposes, and will enable the insular ernment to obtain Federal cooperation in forest fire tection. Previous legislation had authorized Fedl cooperation with the island in the production and ribution of forest planting stock and in forestry ension work.

similar resolution recently approved extends the -protection provisions of the Clarke-McNary law Hawaii.

owth of Shortleaf and Norway Pine in Western Pennsylvania Plantation

hortleaf pine planted on the watershed of the New stern Penitentiary, Rockview, Centre County, Pa., ough slightly out of its natural range, has grown well that Harry G. Eby, forester of the Pennsylia Department of Welfare, considers it one of the t two conifers for planting in that locality. Planted 2-year seedling stock, after five years in the field verages 36.1 inches in height.

he planting site is in old fields lying between the ridges of Nittany Mountain, at an elevation of roximately 1,600 feet. The soil, varying from sand shale, is described by Mr. Eby as deep, porous, and al for tree planting. The volunteer growth in the ds is practically all coniferous—pitch, northern white, ginia, and mountain pine. Shortleaf, Scotch, and thern white pines and Engelmann spruce, all grown the penitentiary nursery, were planted in 1926 on 25 es of the watershed. Two years later the plantan showed an average survival percentage of 93. asurements taken by Mr. Eby in the winter of 30–31 were as follows:

Species	Number of trees measured	Average height (inches)	Maximum height (inches)	Most common height (inches)
rtleaf pine [1]	147	36.1	56	36
tch pine [1]	204	33.6	54	30
rthern white pine [2]	74	22.4	41	18

Planted as 2-year seedlings 3 to 4 inches high.
Planted as 3-year seedlings 4 to 5 inches high.

The shortleaf pine had an advantage over the other pines planted with it in that it suffered no damage from natural enemies. The Scotch pine was somewhat damaged by deer eating the terminal clusters of buds, and the northern white pine, planted in pure stand, was severely injured by weevil. The Engelmann spruce survived but suffered frost damage every spring.

In 1927 an additional 25-acre plantation was made on the watershed with 3-year seedlings of Scotch and Norway pine. The Scotch pine seedlings, which were from 12 to 18 inches tall when planted, have done almost as well as 2-year stock, Mr. Eby reports, although their mortality was slightly higher and their growth was short for the first two years. The Norway pine "has done best of all and is truly a picture." Its percentage of establishment is about 98 and its growth is uniform. The 103 trees measured averaged 18.7 inches in height. The tallest tree was 31 inches high, and 25 per cent of those measured were 18 inches high or higher.

Alabama Plants 33 Miles of Shade Trees

Thirty-three miles of shade trees were planted along Alabama highways during the past fall and winter, State Forester Bunker reports. The federated women's clubs of the State initiated the planting projects and had the cooperation of the highway department and the commission of forestry, the latter providing most of the trees and supervising the planting operations. The plantings were mostly of live oak and water oak. Other trees used were sycamore and hackberry. Roadside trees previously planted in Alabama suffered severely from the 1930 drought, and 863 trees were planted during the fall and winter as replacements.

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The office of H. M. Sebring, assistant State forester of Georgia, has been removed from Albany to Macon. A new district forester is to be located at Albany, with southwestern Georgia as his territory. The territory covered by Assistant State Forester Everett B. Stone, jr., with headquarters at Gainesville, has been enlarged to include all the northern part of the State. Mr. Stone will have under his supervision District Forester W. D. Young, at Rome, and a new district forester to be located at Columbus.

❧

Unemployment relief has been provided in New Jersey during the winter months through a salvage operation in burned cedar on the Bass River State Forest and through improvement work on the Voorhees State Park. Each man sent by the High Bridge unemployment committee who did a day's work on the park received in exchange a load of firewood.

Maine to Develop Forestry Demonstration

Maine's commissioner of forestry, Neil Violette, has decided to institute forestry management on a State-owned township near Princeton known as Indian Township. The land is fairly well timbered with both softwoods and hardwoods. The man employed to manage it will be expected to sell enough timber to pay his own salary and expenses, a plan amply justified by the quantity of timber present. It is Commissioner Violette's hope that the management of this township will bring out the best methods of managing forest lands of similar character in northern Maine. He expects to receive helpful suggestions from some of the timberland owners in that section.

The State of Maine has no regularly established State forests. This tract is expected to serve equally well for the purpose of a practical forestry demonstration on a large scale.

The forest school of the University of Maine will have its winter camp on Indian Township, and the students will help to develop the area.

Forest Area Bordering Highway Given to Connecticut

The State of Connecticut has come into possession of a 186-acre tract of land in the town of Tolland, near West Willington Station, which State Forester Hawes describes as having excellent facilities for forestry demonstration purposes. The land is located on the State highway from Rockville to Willington. This makes it particularly desirable in view of the fact that while Connecticut owns more than 55,000 acres of State forests it has only about 9 miles of State highway bordered by State forests on one side and only about 3 miles so bordered on both sides. The tract is a portion of the land allotted to Ebenezer Nye in 1721 and 1722. It has come into State ownership as a gift from Mrs. William H. Hall, of South Willington. In accordance with Mrs. Hall's wish the property will bear the name "Nye-Holman Demonstration Forest," in memory of her maternal grandparents and her father. The house on the property will be used as headquarters for the Soapstone and Nipmuck State Forests.

During the biennium ending June 30, 1930, the acreage of Connecticut's State forests was increased by more than 25 per cent. On that date it stood at 53,744.

* * *

New Jersey State forest sales and leases brought in $3,390 in the six months ending December 31, 1930. Income from the Lebanon Forest alone amounted to $1,958.

Michigan Enlarges State Forests

From a single unit established 27 years ago, Mi gan's system of State forests has grown until to-da comprises 12 units. In gross area these State for range from 23,000 acres to 255,340 acres. The m rapid expansion of the State forest system has ta place within the past two years, with the additio 302,571 acres to the areas previously placed under ministration. No new units were added during biennium, the additions consisting of privately ow lands within State forest boundaries. Of the t area added the State acquired 38,536 acres by purch 15,398 acres through exchange, 637 acres by gift, 248,000 acres by way of tax delinquency.

The 255,340-acre unit is the Ogemaw Forest, loca in Ogemaw, Roscommon, Gladwin, and Arenac Co ties. Of this area the State owns 49 per cent, 125,193 acres. At the beginning of the year 1 plantations on the Ogemaw Forest totaled 11,146 ac The smallest of the forest units is the Alpena St Forest, in Alpena County, having a gross area 23,762 acres of which the State owns 14,749 acres.

Michigan's State forests are protected by 1,423 m of firebreaks, 247 miles having been constructed wit the past two years. All these firebreaks are c structed on the same plan: A strip 16 feet wide brushed out, within this a 14-foot strip is grubb and within this a 10 or 11 foot strip is plowed. Altho the first cost is high, maintenance costs amount o to about $3 or $4 per mile per year. To the effecti ness of this system of firebreaks the State departm of conservation largely attributes the fact that in 19 although weather conditions were exceptionally favorable, fires covered less than four-tenths of 1 cent of Michigan's State forest area.

Ohio's Forest and Park Holdings Alm Doubled in Two Years

Ohio nearly doubled its State forest and State p holdings in the biennium 1929–30. The most rec addition is the Zaleski Forest of 3,400 acres in east Vinton County. This is the first area purchased Vinton County, although it is only 4 miles west Waterloo Forest, in Athens County.

The Shawnee Forest, which two years ago had area of 17,000 acres, now has one of 35,800 ac Pike Forest has been enlarged from 3,550 to 7, acres. The Hocking series of forest parks has been creased from 2,000 to 2,832 acres, the Virginia Ken Park of 400 acres has been acquired, the Mohican P of 350 acres purchased and later increased to 850 ac and the Hocking Experimental Forest of 608 acres p chased, all since the beginning of 1929.

On February 1, 1931, the State forestry departme holdings, including the Wooster Arboretum and Marietta Forest Nursery, totaled 59,206 acres.

restry Program Proposed for Norfolk County, Mass.

nother 10-year county forestry program has been
ked out in Massachusetts by a committee repre-
ting various local interests and the Massachusetts
estry Association. This time the recommenda-
ıs apply to Norfolk County, which fronts on Boston
y and extends southwest to the Rhode Island State
.

ccording to an estimate by the Massachusetts
ision of Forestry 153,000 acres, or 52 per cent, of
rfolk County's land area is under some sort of forest
wth. Most of this growth is of inferior quality,
sisting largely of maple and birch suitable only for
. There is little timber of such size as to be mer-
ntable for lumber; on the other hand, much of the
er growth has exceptionally high aesthetic value,
ticularly in the northern towns, which are already
hin the metropolitan district or are rapidly coming
ler its influence. Very few woodland owners in
county, the committee found, are making any
ous effort to bring their forest land into a condition
maximum productivity. At present there is little
entive for the woodland owner to invest money in
proving his forests, because of the lack of markets for
products.

he committee found Norfolk County well supplied
h lookout towers and most of the larger towns well
ipped for forest fire fighting. Fire control in the
nty has not, however, been adequate. It has shown
at improvement in the past few years, since organiza-
n of the Forest Wardens Association has resulted in
ter cooperation between town fire wardens.

he committee strongly recommends that Norfolk
unty accept the provisions of the Massachusetts law
ough which the State offers to pay half the cost of
est fire patrol maintained by any county. This law
s enacted on the basis of favorable results obtained
the 3-year fire-protection experiment carried out on
pe Cod. In excessively dry periods during the fire
son it recommends supplementing county patrol
th town patrol. As an example of the value of town
trol it cites the fact that for three years following
option of the patrol system by the town of Plymouth
e losses in the town averaged less than 10 per cent of
e previous annual average, and that the cost of forest
otection was at the same time reduced more than
ree-fifths. In Plymouth a patrolman is placed on
ty in each of six districts on Saturday afternoons,
ndays, and holidays during the fire season. The
mination of hazards such as town dumps or logging
sh is recommended as one of the best forms of
eparedness in fire prevention. A reminder that
any fires get beyond control because the local warden
es not know the location of the water supply nearest to the fire and hence loses time in determining where to locate his pump introduces the suggestion that each warden and deputy warden should have a map of his territory on which are indicated all water supplies suitable for operating a portable pump, and should familiarize himself with the locations of these supplies. The installation of summer water service, with the pipes merely laid on the ground, is mentioned as a well justified measure for protecting forest tracts lying beyond permanent town water service and lacking natural water supplies.

Referring to the brushing out of woods roads so as to divide large forested areas into tracts of about 160 acres each, as in the Cape Cod experiment, the committee says "There is no more useful type of work to be found for the unemployed." Other fire-protection measures recommended include educational work through the public schools, purchase of at least one more State forest fire truck for use in Norfolk County, and the use of town-owned power sprayers for forest-fire work.

Owners of northern white pine timber are urged to avail themselves of the blister rust control service provided by the Massachusetts Department of Agriculture.

Because of the limited area of the individual forest tracts in Norfolk County there is little opportunity to establish State forests there. This, the committee holds, makes it all the more important that town forests be developed. Norfolk County contains only 5 of the 90 town and city forests in Massachusetts. In the Walpole town forest the county has an excellent example of a well-developed town forest that is used for park purposes. The establishment of town forests in Massachusetts is encouraged by the State Forestry Association's standing offer to plant 5,000 trees free of charge for any town that will establish a forest of 100 acres or more.

Formation of woodland owners' associations throughout the county is recommended as a possible means of extending the practice of forest management and increasing profits from production of forest crops.

The members of the committee were Augustus Hemenway, jr., Canton (chairman); Phillip R. Allen, Walpole; William Edwin Clark, Sharon; Samuel C. French, Westwood; Willis H. Hoyt, Walpole; H. Franklin Perry, Weymouth; and Harris A. Reynolds, Belmont.

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The Governor of Utah has agreed to cooperate with the United States Forest Service in installing a forestry exhibit on the ground floor of the State Capitol. A relief map of Utah will form the central feature of the exhibit and will be surrounded by models representing forest management, watershed protection, range management, and forest recreation.

New York Spends $350,000 on Game and Fish

New York's conservation fund, into which is turned half of all the money received by the State from the sale of licenses for hunting, trapping, and fishing, was drawn upon last year to the extent of $350,000 for the benefit of hunters and fishermen. For planting fish and establishing and maintaining rearing stations $144,442 was expended; for biological survey, including fish protection, $58,825; for acquisition of nonagricultural land outside the forest preserve for game refuges and demonstration forests, $49,296; for game surveys, purchase of game birds and quadrupeds, game bird farm labor, etc., $37,355; for the Ithaca game farm, $16,853.

* * *

Recent purchases have added 38,562 acres to the area of Vermont's State forests. The prices paid averaged less than $3 per acre. The Proctor-Piper Forest in Cavendish has been enlarged by 60 acres and the Calvin Coolidge Forest by 1,428 acres.

* * *

Forest tree seedlings distributed from the State nursery of South Carolina in January and February of this year totaled about 900,000.

* * *

Plantations on and around Chubb Hill, N. Y., on the main highway between Saranac Lake and Lake Placid, which were established in the period 1904–1909 by the late Clifford R. Pettis, superintendent of State forests from 1910 to 1927, have been designated as the Clifford R. Pettis Memorial Forest. The plantations are part of the State forest preserve. They lie along both sides of the main highway and cover several hundred acres.

* * *

Deer killed by licensed hunters in New York State in the recent hunting season numbered 7,085. This is the largest number taken in any one year since the enactment of the law providing for a special license for deer hunters.

* * *

The Cumberland Falls tract has become the property of the State of Kentucky, an amicable agreement having been reached by representatives of the State and of the power interests which held an option on the tract. For 589 acres of land including the falls the State paid $400,000. Of this amount $230,000 had been given to the State by the late Senator T. Coleman du Pont and the remainder was given by the Senator's widow and other heirs.

Michigan Plants 329,145,000 Fish During 1930

In 1930 the Michigan State fish hatcheries planted 329,145,000 fish of various kinds in the inland waters of the State and in Lakes Superior, Huron, and Michigan and Saginaw Bay. This is reported by the State department of conservation as the largest annual plant in the history of fish propagation in Michigan. It included 5,480,000 brook, brown, and rainbow trout fingerlings 3 months old, nearly 9,000,000 6-months-old perch, 2,800,000 4-months-old bluegills, and 800,000 large-mouth and small-mouth black bass. During the year 10 raceways were added to the Baldwin trout-feeding station and 5 bass and bluegill rearing ponds were constructed at the Wolf Lake hatchery, and the Tahquamenon River and Silver Creek trout-feeding stations were doubled in capacity. The State acquired 40 acres trebling the length of the nursery section of the White River trout-feeding station and property in the neighborhood of the Wolf Lake hatchery that will be operated in conjunction with it, and received as a gift from the Hillsdale Chapter of the Izaak Walton League the Emery Mills site, near Hillsdale, where two bass and bluegill rearing ponds are under construction. Also during 1930, the Institute for Fisheries Research was organized in cooperation with the University of Michigan. This institute, which is under the direction of Carl L. Hubbs, has taken over the investigations formerly conducted by the late Jan Metzlaar. The State division of the Izaak Walton League has cooperated with the institute by establishing three scholarships for fisheries research in the University of Michigan.

* * *

Establishment of four new town forests in Massachusetts during 1930 increased the aggregate area of such forests in the State by one-third, making it 25,535 acres. For that year town forest appropriations totaled $20,358 and the number of trees planted on town forests was 494,000.

* * *

The first forest fire observation tower in southwestern Georgia was recently erected by the Pine Island Timber Protective Organization near Albany, Ga. The tower is 60 feet high and is located on a 20-foot hill. It has an inside stairway built of heart cypress.

* * *

Under a law of 1929 commercial termite-contro operations in California are regulated by the State all persons engaging in the business of repairing structures damaged by termites being required to hold certificates issued by the county agricultural commissioner.

Education and Extension

ebraska Snow Fence Plantings Reach Useful Stage in Three Seasons

Trees planted in Nebraska in 1928 on land adjoining e right of way of the Chicago, Burlington & Quincy ailroad have already, in some places, grown large ough to serve effectively as railroad snow fences, rites Extension Forester Clayton W. Watkins. nder a plan suggested by the extension service which as designed to supply snow fences for the protection railroad lines and shelter belts for adjacent farm nd, as well as serving a beautifying purpose, the ilroad purchased trees, planted them on land belongg to cooperating farmers, and took responsibility r caring for them. Requirements as to care were ell fulfilled and the plantings are rated about 85 per nt successful, as compared with an average of about per cent for regular farm shelter-belt demonstraons in Nebraska. One hundred and eleven of these emonstration snow-fence shelter-belt plantings are eveloping, at points scattered pretty well over the tate. The most successful one of all is on table-land western Nebraska where trees are rather rare. Its ree rows of trees include Chinese elm, Russian-olive, nd caragana. It has been grown without water ut has been cultivated and hoed regularly.

ractical Work of First-Year Students in Pennsylvania State Forest School

By J. A. Ferguson, Pennsylvania State College

The 75 students of the Pennsylvania State Forest chool who are now at Mont Alto engaged in the rst year's work of the forestry and forest ranger ourses devote one day each week to practical work on he Mont Alto State Forest and State Forest Nursery. During the year they take part in all the activities of he forest. In this way they gain facility in the use of woods tools, learn woods methods at first hand, and acquire a conception of the practical problems of administration with which a forester in charge of more than 20,000 acres of forest land and a forest nursery is confronted in the course of a year. During the past chool year student labor on the forest and nursery totaled 13,089 man-hours. Of this total, improvement cutting claimed 4,104 hours; road work, 2,769 hours; nursery work, 2,702 hours; cleanings, 1,045 hours; preparation of planting sites, 914 hours; pruning operations, 855 hours; and planting in the field, 700 hours.

In addition, the forestry students at Mont Alto form a part of the fire-fighting force for the region. They are organized and trained in three crews, under student leaders. Each student is equipped to perform his particular crew duty. As fire fighters the students work under the direction of State forest officers and under the immediate supervision of their instructors. Last year they were called out to suppress 14 forest fires and devoted 1,619 man-hours to fire fighting.

University of Montana Prepared to Distribute 1,000,000 Forest Trees in 1931

The forest nursery established by the University of Montana in 1927, under provisions of the Clarke-McNary Act, is now ready to supply farmers of the State with 1,000,000 trees a year. The trees are available at a low charge for planting farm shelter belts, windbreaks, and woodlands. In 1930 the nursery shipped about 500,000 trees.

In regard to choice of forest tree species for planting and in regard to methods of planting and caring for the trees, farmers in the prairie sections of Montana have the benefit of many years' experimentation directed by the Northern Great Plains Field Station of the United States Department of Agriculture, at Mandan, N. Dak. Hardwood species available for distribution from the university nursery include caragana, Russian-olive, boxelder, golden willow, cottonwood, "Northwest poplar" (*populus* sp.), Chinese elm, American elm, green ash, laurel willow, European larch, and "Ross northwestern poplar," a hybrid obtained in the vicinity of Saskatoon, Canada. The conifers include blue spruce, western white spruce, jack pine, Scotch pine, and western yellow pine.

New York State Forest Research Institute

The New York State Forest Research Institute has been established as a division of the New York State College of Forestry, in order to give the college's research work more effective direction and further the application of its results to the practice of forestry in the State. A particular purpose is to give greater assistance in public and private reforestation work. Clifford H. Foster, director of the Pack Demonstration Forest, is to be acting director of the institute.

The college is conducting forest research on the ranger school forest of 2,300 acres at Wanakena, near Cranberry Lake, in the western Adirondacks; at the Pack Demonstration Forest of 2,400 acres near Warrensburg, N. Y.; at the State forest experiment station, in Syracuse; and on lands owned by the college near Salamanca, in Cattaraugus County.

Montana University "Tractor School"

Men using tractor equipment and power machinery in the woods are invited each year by the University of Montana to attend a "tractor school" of several days' duration in which the use and maintenance of such machinery are demonstrated and explained and new models are shown. Approximately $30,000 worth of machinery is furnished for this purpose by a local tractor agency. In conducting this spring's tractor school the forestry staff of the university and field men from the tractor company will be assisted by two factory instructors, two logging engineers, one industrial engineer, one equipment engineer, and two service men.

New Hampshire Farmers Favor Adoption of Standard Grades for Maple Products

About 775,000 sugar maples are tapped each spring in New Hampshire, writes Extension Forester K. E. Barraclough. The sap from these trees yields about 230,000 pounds of sugar and 175,000 gallons of sirup, together worth about $450,000. In February of this year Mr. Barraclough held nine meetings in different sections of the State for discussion of improved methods of producing maple sirup and sugar. Two hundred farmers who make sirup each spring attended the meetings. A farmer from Vermont who is a practical sugar maker described the methods used in making fancy sirup, the deputy commissioner of agriculture explained the Vermont maple sugar grades, and Mr. Barraclough made suggestions on the care of the sugar orchard. All the sirup producers attending the meetings indicated that they would like to have the State commissioner of agriculture establish voluntary standard grades for New Hampshire maple sirup and sugar similar to those already established in Vermont. Under these standards fancy sirup must be free from foreign material, weigh 11 pounds to the gallon, and be of a color no darker than No. 5, United States Color Standards. Grade A must be no darker than No. 7 and grade B no darker than No. 9.

Drought Relief Through Cash Purchase of Pulpwood

The Southern Advance Bag & Paper Co., Hodge, Jackson Parish, La., in its purchases of pulpwood is giving priority to farmers who suffered crop loss as a result of the prolonged drought of last year. This practice was adopted by the company under an agreement formed with Extension Forester Robert Moore and County Agent Leon Mitchell. Each farmer's application for priority requires the approval of Mr. Mitchell, and this is given only if the timber is in condition for cutting. The applicant must agree to cut the timber properly and to protect his woods from fire for three years after the cutting. The company pays cas for the pulpwood and accepts delivery either at th mill or on a railroad siding.

* * *

In a letter recently circulated to all North Carolin county agents, Extension Forester R. W. Graeb listed 36 firms in the State that buy veneer logs an are willing to buy them direct from farmers. Fo about half the firms listed the letter gave informatio as to the kinds of logs purchased.

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Arkansas foresters, lumbermen, bankers, busines men, and farmers, and representatives of the Feder Government, took part with Extension Foreste Charles A. Gillett as speakers in what Mr. Gillet called an extension school of forestry, held at Pin Bluff, Ark., December 11–12. Attendance totaled 25 Three half-day sessions of talks were followed by a inspection tour of wood-using industries of Pine Bluf

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Thirty-seven students representing 24 institutions ar enrolled this year in the Yale School of Forestr Twelve additional students are enrolled in the department of forestry of the Yale Graduate School.

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A bus has been purchased by the North Carolin State College to transport forestry students over th 40 miles separating the George Watts Hill demonstration forest from the college and on trips to other poin for study of forest conditions and logging method An assessment for this transportation, based on charge of 1 cent per mile, is levied on each forestr student, and when the bus is not being used by th forestry department it is available to other departmen of the college at that rate per passenger.

* * *

The board of education of the town of Trento Oneida County, N. Y., expects to begin planting 126-acre school forest this spring. A tract of tha size has been given to the board for reforestatio purposes. The plan is to set out 12,000 trees eac year. School district forests in New York on whic planting was begun in 1929 or earlier number 12 Previously the largest tract dedicated to such use i the State was one of 98 acres in the town of Watso Lewis County, where planting was started 10 year ago and the school children plant from 5,000 to 10,00 trees each Arbor Day.

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First-year 4-H forestry club members plante 767,000 trees in New York State last year at the rat of 1,000 trees each. According to the estimate Assistant Extension Forester J. E. Davis nearly 80 pe cent of the trees survived the summer.

Forest Service Notes

Slvicultural Improvement Through Sales on the Front Range in Colorado

By M. W. Thompson, United States Forest Service

The forests of the Front Range in Colorado were awn upon heavily in the old days, at the time when ining was being actively developed and the railroads re being built. Later a great deal of local timber s used in the development of agriculture in the region well as in the settlement and building up of a large mber of cities and towns. No organized fire protec- n was given to the forests until 1905. Prior to at time, fires that did not threaten improved property re permitted to burn unchecked until they were put t by natural causes. Serious fire damage occurred on any areas.

The characteristic fire reactions of the Douglas type, the lodgepole pine type, and the Engelmann ruce type are determined by the following facts: ouglas fir resists fire more successfully than the other incipal species of the region, so that an occasional ed tree survives fire; lodgepole pine retains on its anches from year to year many tightly closed cones hich open when subjected to the heat of fire, with the sult that seed are scattered profusely over the burned ea; Engelmann spruce is not resistant to fire and does t bear serotinous cones. In the Front Range the eatest lasting damage from fire occurred on large eas in the Engelmann spruce and subalpine types here the forest was so completely destroyed that even t, after an interval of 60 years or more, it has not en fully reestablished. On practically all sites where dgepole pine occurred dense stands of reproduction this species followed the old fires. In the case of the ouglas fir type the damage done by early fires was ot so permanent as in the case of the Engelmann ruce and subalpine types. On many areas conditions llowing the fires were very favorable for the reproduc- on of Douglas fir. This is shown by the very dense ands of trees of this species from 40 to 60 years old hich occur on north and east slopes near the lower mits of tree growth throughout the Front Range. xcept on portions of the higher, subalpine region entioned, in fact, protection for a period of 25 years as resulted in a gradual restocking of timber in all ypes.

Most of the early cutting and most of the destruction y fire was concentrated on restricted areas near the enters of industrial and agricultural development. n some more remote areas extensive stands have ecome seriously overmature. Large quantities of ound, usable, dead timber remain on old burned-over areas. In addition, many restocked areas are urgently in need of silvicultural improvement. These include badly crowded stands that need thinning and stagnant stands containing trees of mine-prop size that should be cut heavily. In short, there is an urgent need of silvicultural improvement throughout the Front Range. Such improvement, obviously, can take place only as fast as the market for forest products permits.

Ways in which this situation is being met on the national forests are typified by the following:

(1) In dense, pole-sized stands of western yellow pine on the Colorado National Forest, trees are being removed as a thinning and utilized for mine props and mine ties. These products are hauled directly to the coal mines in the vicinity of Boulder. Stumps are cut close to the ground and trees are utilized to a top diameter of about 4 inches. This results in a well-spaced stand of trees which should produce satisfactory saw timber.

(2) Stagnant stands of lodgepole pine on the Cochetopa National Forest are being clear cut where the trees are mature and thinned where they are immature. Tops are utilized to the 5-inch point and sometimes to 4 inches. The larger trees are utilized for saw logs, railroad ties, or telephone poles, and the smaller trees are used for telephone poles or mine props. Clear cutting is being followed by a complete natural restocking, and thinning leaves a stand that will provide satisfactory future cuts.

(3) In a mixed stand of white fir and western yellow pine on the San Isabel Forest, in which the trees are of comparatively small size, an improvement cutting is being made to remove the white fir. The product of this cutting consists entirely of mine props and mine ties. These are being hauled directly to the coal mines above Walsenburg. A satisfactory stand of western yellow pine that should produce railroad ties or saw logs remains after the cutting.

(4) Beginning about 10 years ago, progress has been made in thinning the dense stands of Douglas fir on the Pike National Forest. Some acres contain as many as 10,000 or 15,000 trees, generally not more than 30 feet tall and in a stagnant condition. This number is reduced to about 500 to 700 trees per acre. The trees that are suitable are used as Christmas trees. This business has gradually increased; in 1930 nearly 17,000 Christmas trees were obtained on the Pike. Recognition of the desirability of thinnings of this character has spread so that similar cutting is taking place on nearly every national forest in the region.

(5) A total of 13,778 acres on the Pike Forest has been successfully planted, largely with Douglas fir and

western yellow pine. Some of the earlier plantations, those now about 20 years old, have developed to the point at which thinnings are necessary. Accordingly, several thousand trees in these plantations are sold each year for use in ornamental planting. The largest number removed in any one year was the 17,745 sold in the spring of 1926.

(6) Partly as a result of the sale of planted trees for use as ornamentals, during the past few years a market has developed for wildings for ornamental planting. In fact, there is a keen demand for blue spruce and Rocky Mountain red cedar, especially for specimen blue trees of these species. There is also a call for trees of other species such as Douglas fir and western yellow pine and for various shrubs and hardy perennials. Trees to be dug are so chosen that their removal improves the spacing in the stands. This business has developed so that in 1930 more than 10,000 trees were dug on the national forests in the Front Range in Colorado. As in the case of Christmas trees, the call for such trees has spread so that sales of this class are made on nearly every national forest in the region.

(7) A good many sales of a salvage nature are being made in overmature stands of green timber. Also, dead timber is removed for fence posts and for fuel wood.

It is appreciated that the thinnings, improvement cuttings, and salvage sales that are being made on national forests in the Front Range in Colorado are rather limited in extent and are not of great importance from a public standpoint. However, desirable silvicultural practice is being followed, close utilization is being obtained, and trees and various timber products are being supplied, largely to a regional market. It seems obvious that demands will continue to increase, making it possible to extend the operations and so helping to restore the forests to a more productive condition.

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Forage plants with which the Intermountain Forest and Range Experiment Station has obtained good results in artificial seeding work on areas at elevations of from 6,700 to 8,000 feet where annual precipitation ranged from 14 to 20 inches are yellow sweetclover, white sweetclover, crested wheatgrass, and violet wheatgrass. Hungarian brome and the native mountain brome will seed in the oak zone but not at the higher elevations. Yellow sweetclover formed a better stand than white sweetclover, bloomed 10 to 18 days earlier, and matured seed at elevations as great as 8,000 feet.

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National-forest receipts for the period July 1–December 31, 1930, were $2,474,644, which is $770,519 less than receipts for the corresponding period in the preceding year. The decrease was principally in timber sales.

Erosion Studies Under Way in Southe Idaho

By F. G. Renner, United States Forest Service

Southern Idaho has an acute erosion proble largely because the soils of the region are compos mainly of loose, coarse granite sand. In 1929 Forest Service survey covering 128,000 acres of t watershed of the south fork of the Boise River show that only 27 per cent of this area was not erod Much of the land that had escaped erosion was p tected by dense brush and was inaccessible to sto Of the total area 17 per cent was badly gullied. Lan that had lost a large part of their upper soil layer a had been subjected to widespread sheet erosion ma up 56 per cent of the total. According to estimates engineers connected with the local irrigation proje erosion has reduced the storage capacity of the A rowrock Reservoir by from 7,000 to 8,000 acre-fe and accumulations of sand and erosion débris bel the diversion dam have reduced the efficiency of t reservoir's power plant by 25 per cent. These cumulations have occurred in spite of costly ann attempts to sluice out the reservoir, river channel, a diversion canals.

In an effort to check erosion and prevent furt depletion of the vegetative cover, since 1924 the nu ber of livestock grazing on the watershed has been duced by 45 per cent. It now appears that this duction has not kept pace either with soil losses with cover depletion, and that thorough-going, tailed experimental work, carried on over a num of years, will be necessary to determine the mana ment requirements of soil, timber, and forage.

Experimental work on several phases of the pr lem has been started by the Intermountain For and Range Experiment Station. Many profile surve showing elevations to one-thousandth of an in have been established on selected sites over the drai age. Periodic rechecking of these surveys is expect to furnish very accurate data on the movement of t soil and changes in the degree and rate of erosi One hundred plots varying in size from 1 square me to 2 acres have been established for the purpose studying in detail the relation of type and density vegetation, slope, soil characteristics, the action rodents, and other factors to erosion.

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Fires on the national forests in 1930 burned o eleven-hundredths of 1 per cent of the gross area the forests. The gross national-forest area burn over during the year totaled 205,781 acres. Bo man-caused fires and lightning fires occurred in grea numbers than in 1929. The increase in the number fires was confined to the East, the number of fires western national forests being less than in 1929.

hristmas Tree Production Methods to be Tested on Chippewa Forest

By HOWARD HOPKINS, United States Forest Service

Last year forest officers on the Chippewa National rest, Minn., made an extensive survey of Christmas- e markets in the Central States. The results indi- ted that most of the Christmas trees sold in the gion are shipped in either from New Hampshire and rmont or from the even more remote Douglas fir gion of the Pacific Northwest. At the same time ousands of acres of land in the Lake States admirably ited for the production of spruce or fir Christmas es is being ignored as of no value. As the first step determining the possibilities of profitable production Christmas tree crops on the Chippewa, in the hristmas season of 1930 more than 3,000 balsam fir and ack spruce trees averaging from 4 to 6 feet in height re sold on the stump. In general the cutting of ese trees resulted in stand improvement, the trees ing removed either from an undesirable understory in the form of a needed thinning. The price received the forest averaged more than 5 cents per tree.

As a demonstration forest the Chippewa will not be tisfied with increasing sales of this nature. It will so establish on various sites plantations of white ruce, black spruce, and balsam fir from which trees ay be taken for the Christmas market both as the ain crop and as a side crop in connection with pulp- od production. Another suggested method of hristmas-tree production is to use for this purpose the ps of trees cut for pulpwood. The objection has been ised that the limbs of older trees are too brittle to rmit bending and packing as Christmas trees. A lution of this difficulty will be sought in experiments the Chippewa. Still another method, which has orked out very successfully in small-scale operations national forests of the Southwest, is to lop the tops om standing trees, leaving the tree standing. The ll root system of the lopped tree rapidly sends out a w shoot which usually develops to Christmas-tree ze within a very short time.

In connection with tests of these different ways of oducing Christmas trees the Chippewa will keep care- l records of costs and returns. As the best and most rofitable methods of handling such a crop are indicated e information will be broadcast so that private land- wners may profit by the experiments and experiences Government land. On the Chippewa Forest the umpage value of a Christmas tree 4 to 6 feet tall is ten equal to the stumpage value of a two-bolt tree 0 to 50 feet high. Many thousands of acres of land ow idle in the Lake States is suitable only for the pro- uction of slow-growing black spruce trees. If the hippewa Forest demonstrates that it can raise in 20 r 30 years Christmas tree crops equal in stumpage alue to pulpwood the growing of which would require 100 years, it may cause many abandoned acres to be brought into profitable use.

Effect of a Single Winter Fire on Planted Slash Pine

By PHILIP C. WAKELEY, United States Forest Service

In January, 1930, a fire ran through half of a 10-acre slash pine plantation on an old field in Jackson County, Miss. The trees were spaced 6 by 8 feet. At the time of the fire they were four years in the field and five from seed, and were large enough to be past the worst danger from burning. The plantation contained a small percentage of loblolly pines a year younger than the slash pines, planted to fill gaps caused by the death of slash seedlings during their first season in the field. The ground cover consisted mostly of broom sedge and blackberry vines. The fire was hot enough to defoliate most of the slash pines and kill all the loblolly pines. In October, 1930, one full growing season after the fire, a crew from the Southern Forest Experiment Station and the Mississippi Commission of Forestry studied the plantation to learn the exact effect of the burn.

On the unburned half of the plantation the survival of the original slash pine planting, as shown by a count of 1,000 seedlings, was 70.5 per cent. On the burned half the survival of the slash pine, similarly determined, was only 62.3 per cent. The difference of 8.2 per cent in survival at the end of the fifth year is directly attributable to the burn; a statistical measure known as the standard deviation of the difference shows that in the present instance there is only one chance in a hundred that the difference is due to an error in sampling.

The average height of the slash pine on the unburned half, as determined by measuring 300 trees, was 12.4 feet. The average height on the burned half was only 11.2 feet, or 1.2 feet less, a difference which analysis shows could not within reason be attributed to errors in sampling, but only to the effect of the fire. This difference of 1.2 feet, it should be remembered, showed up in the course of only one season's growth; that is to say, the fire caused a loss of 1.2 feet out of about 4 feet of potential growth.

The accurate records and consistent data available concerning this plantation make the results of the fire-damage study particularly clear-cut and dependable. It is evident that even a winter fire in an open stand of slash pine 8 to 9 feet high, although it may not make a hopeless wreck of the stand, is apt to kill practically one-tenth of the trees and to reduce the following season's height growth of the survivors by 25 per cent or more.

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An act approved January 26 enlarged the Ashley National Forest, Utah, by 38,000 acres. The lands added lie north of the Wyoming State line and are known as the Fort Bridger Addition.

Forest Service Appropriation Increases for 1932

The agricultural appropriation act for 1932 makes $16,954,620 available to the Forest Service, exclusive of forest road and trail appropriations, receipt funds, and special items. This represents a total increase of $1,040,970 over the appropriations for the preceding fiscal year. Some of the increases included in this total are $90,000 for fire-protection improvements on the national forests, $42,160 for additional forest guards and fire-fighting equipment, $25,000 for forest planting, $24,000 for administering timber-sale business, $20,000 for administering and protecting lands being purchased for national-forest purposes, $20,000 for blister-rust control in Idaho, $20,000 for administrative improvements on the national forests, $20,000 for range improvements, $10,000 for sanitary improvements and fire-preventive measures on public camp grounds on national forests, $10,000 for grazing administration, $9,940 for timber surveys and range reconnaissance, $8,000 for general surveys and maps, and $8,000 for control and regulation of recreation areas.

For cooperation with States in protecting State and privately owned forest lands from fire $74,800 more is provided than in the appropriation act for 1931.

Appropriations for research projects include increases totaling $211,800, distributed as follows:

Forest management research:	
Pacific Northwest Forest Experiment Station, determination of the best methods of preventing and suppressing forest fires	$15, 000
Northern Rocky Mountain Forest Experiment Station, determination of the best methods of preventing and suppressing forest fires	15, 000
Northeastern Forest Experiment Station —	
Forest planting investigations	10, 000
Study of growth and yields of the northern hardwoods	10, 000
Southwestern Forest Experiment Station, for investigations of methods of insuring natural reforestation in Douglas fir and western yellow pine forests	2, 660
Lake States Forest Experiment Station, for a study of reforestation in North Dakota and adjacent Plains States	15, 000
Range investigations:	
Southwestern Forest and Range Experiment Station—	
For studies of the relation of water to damage by sheep to western yellow pine reproduction	7, 120
For studies of ways and means of restoring range revegetation on southwestern sand dunes and denuded gravelly ridges	7, 120
Range investigations—Continued.	
California Forest Experiment Station—	
For studies of range management in the California pine types	$10, 00
For studies of range management in the foothill winter ranges	10, 00
Range utilization research in cooperation with the United States Range Livestock Experiment Station, Miles City, Mont	10, 00
Forest survey:	
Southern Forest Experiment Station	40,00
Northern Rocky Mountain Forest Experiment Station	20, 00
Forest survey research and administration, advance assignments	14, 90
Forest economics, for developing plans for handling the new public domain	25, 00
Soil erosion investigations	70, 00

For completing the construction of the new buildin for the Forest Products Laboratory $700,000 wa appropriated.

Of the amounts included in the 1932 act the follow ing were made immediately available on passage the act, as a measure for unemployment relief: Fo sanitary and protective improvements, $40,000; fo blister-rust control, $45,000; for protective, admin istrative, and range improvements, $495,200. Emer gency appropriations designed to relieve unemploy ment and meet urgent needs of the Forest Service wer as follows: For construction of forest roads and trai in 1931, $3,000,000; for administrative and protectiv improvements, $254,800; for insect control, $100,000 for blister-rust control, $150,000.

The emergency forest highway fund of $3,000,00 has been programmed to projects in all the 32 Stat containing national forests.

The regular forest highway fund for the fiscal yea 1932 amounts to $9,500,000. This amount, as appo tioned to national forest States by the Secretary Agriculture, has been programmed to practically a the States containing national forests. Cooperati agreements, plans, and estimates for the work on whic this fund is to be expended are being rushed with th purpose of relieving unemployment.

Three New National Forests in Uppe Michigan

The Hiawatha, Marquette, and Ottawa Nation Forests have recently been created in the Upp Peninsula of Michigan. The Hiawatha Forest com prises the lands formerly designated as the Mackin purchase unit, lying in Alger, Schoolcraft, and Del Counties. It has a gross area of 270,071 acres, which 178,564 acres is still in private ownership. Th Ottawa Forest, formerly the Keweenaw purchase un is located in Houghton, Iron, Ontonagon, and Gogeb unties. Of its gross area of 252,551 acres only 80,059 res has been acquired or is in process of being ac- ired by the Government. The Marquette Forest, merly the Marquette purchase unit, in Chippewa unty, has a gross area of 275,986 acres, of which the vernment owns or is acquiring 109,223 acres.

These three new forests will all be under the manage- ent of one supervisor, with headquarters at Munising. nger stations will be at Munising, Raco, and Kenton.

alifornia Station Conducts Controlled Experiments Bearing on Stream Flow and Erosion

The effect of forest litter upon surface run-off is due most entirely to the effect of the litter in maintaining aximum water-percolation capacity in the soil profile derlying it, according to preliminary findings in idies now being conducted by the California Forest kperiment Station. The water-absorptive capacity the litter itself contributes very little to this effect. hen the litter is removed surface run-off is increased om 3 to 60 times, according to the character of the il and the intensity of precipitation, and the solid atter eroded by the run-off is increased from 50 to 000 times. Soil texture is more important than adient in determining the relative quantity of run-off om bared soils; but the gradient directly affects the iantity of material eroded, the latter increasing arkedly as gradients go above 15 per cent. With tensities of rainfall below 0.5 inch per hour the con- tion of the soil surface has little influence upon run-off id erosion in the soils thus far studied; but surface in-off resulting from rainfall having an intensity as eat as 1 inch per hour increases rapidly, and the osion effect of such run-off increases enormously, on il surfaces that have been bared. This is due to the ct that the impacting raindrops pick up fine particles om bared soil surfaces and that the absorption of lt-laden water progressively clogs the percolation iannels in the soil.

In its work relating to stream flow and erosion the alifornia station is carrying out a series of controlled cperiments, making use of rectangular tanks contain- g soils placed layer by layer in the same order in hich they occurred in nature. Paired tanks contain ie same kind of soil with different conditions in respect cover, or soils of different classes and kinds under ie same sort of cover. The first phase of these experi- ents has to do with the distribution of precipitation rough run-off and percolation and with the erosion ccompanying run-off. The second phase is ecological udy of vegetative succession as affected by disturb- nces such as fire, grazing, and lumbering. The third as to do with the water requirements of different ants and vegetative types under normal conditions id as affected by disturbances. It may be remarked iat since in southern California the total precipitation is inadequate to meet human needs it is a matter of special importance there to know whether a given vegetative type conserves more soil moisture than it utilizes and how it compares in this respect with other types.

The results from these controlled experiments are being checked against results obtained on field plots so established that the precipitation received upon them and the run-off and erosion from them can be accurately measured.

Experimental results thus obtained are to be applied to paired watersheds, first small ones on which conditions can be kept fairly simple and then larger ones. On one watershed of each pair so used the vegetative cover will be maintained as nearly unbroken as possible; the other will be thoroughly denuded of such cover. In cooperation with engineers, tests will be made of different methods of measuring the silt load of waters and of determining the relation of silt deposit in reservoirs to vegetative conditions and disturbances on the tributary watersheds. Finally, the station will study problems involved in managing the vegetative cover on watersheds so as to control erosion and make possible more complete utilization of precipitation. Experiments of this last group will have to do with forest planting, control of fire and grazing, and coordination of the management of vegetative cover with engineering works.

Purchase of 254,000 Acres of Land for National Forests Approved

The National Forest Reservation Commission at its meeting of February 25 approved a purchase program involving 290 cases in 19 States, with an aggregate acreage of 254,022. The prices approved averaged $4.67 per acre, totaling $1,186,159. The lands are located in 26 separate purchase units, the effective administration of which will be markedly promoted by these purchases. The largest single purchases approved at this meeting are 63,147 acres in the Homochitto unit, in Mississippi; 31,228 acres on the Green Mountain National Forest, in Vermont; 31,110 acres on the Nantahala National Forest, in Georgia and the Carolinas; 27,000 acres on the Ottawa National Forest, Mich.; 21,156 acres on the Pisgah National Forest, N. C.; and 17,131 acres on the Allegheny National Forest, Pa.

A question left over from a previous meeting of the commission had to do with the propriety of the prevailing policy of accepting lands subject to reservations or exceptions of mineral rights in cases in which the vendors were unwilling to relinquish such rights for the prices the United States was willing to pay for the lands. After a discussion of the legal and administrative aspects of the situation the commission decided that it would continue to acquire lands subject to mineral reservations or exceptions where such reserved rights did not impair the value of the lands for streamflow protection or timber production.

Another question considered was that of initiating purchase work in the new Green Mountain unit in southern Vermont. The lands in this unit are well timbered and therefore have a higher average value per acre than the lands hitherto acquired or subject to purchase in other units. The discussion led to approval of the purchase of eight tracts of land containing 31,228 acres at an average price of $11.02, or a total cost of $344,075.50. These lands form a relatively compact unit, are of high forest quality, and support excellent stands of timber providing a splendid opportunity for early initiation of intensive silvicultural management.

A proposal to establish three new purchase areas in Wisconsin and to make a substantial addition to the existing Oneida purchase unit in that State was considered. The commission withheld approval pending study of the purchase program in all regions east of the Great Plains and a final determination as to its most urgent requirements.

The commission abolished the original Vernon purchase unit in southern Louisiana, where purchases hitherto have proved impracticable, and established instead of it a new Vernon unit of approximately the same area situated 30 miles or so to the southeast of the original area.

Map Locates Black Walnut Plantations in Central States

A map recording the location of black walnut plantations in the Central States has been prepared by L. F. Kellogg, of the Central States Forest Experiment Station. The map shows all plantings discovered in the course of the station's field work, as well as those for which records existed in the files of State foresters, forest schools, and the United States Forest Service. The map is on a scale of 24 miles to the inch. It is available for reference only.

The map shows a concentration of plantations in central Illinois, a rather general scattering of planted groves over Iowa, and a relatively infrequent occurrence of plantings in Indiana, Ohio, and Kentucky. Records for northern Missouri are very incomplete. In Illinois and Iowa the areas on which walnut plantations are most numerous practically coincide with the regions of open prairies. This fact substantiates the conclusion, drawn from examination of about 300 individual plantations, that these groves were established in order to provide man and beast with protection from the wind. In relatively few cases was timber growing the principal motive. Though largely intangible, the benefits of these groves have been very great.

It is expected that the station will develop similar maps showing the extent to which other forest tree species have been planted in the Central States.

Unemployed Cut Fuel Wood on Pisga National Forest

By J. H. Buell, United States Forest Service

Cutting of firewood on the Bent Creek tract of t Pisgah National Forest, near Asheville, N. C., is helpi to solve the problem of unemployment in the city Asheville and in Buncombe County. The cutting al constitutes an unexpected and material advance experimental work conducted on the tract by t Appalachian Forest Experiment Station.

During the past summer trees were marked for thr different experimental cuttings on the Bent Cre experimental tract, but no sale could be made. began to look as if there would be no chance to get t trees cut before spring. Then, about the middle December, came the application of the wood-ya committee of Asheville's Employment Council f firewood that could be had for the cutting.

Work was begun at once. Between December and February 1 some 1,100 unemployed men of Ash ville were aided, and 300 cords of wood were broug into the city and sold. To each man working thr days in a week either in the woods or at the wood yar the wood-yard committee is giving a week's supply food for his family. About 50 men are employed ea day at Bent Creek. The wood is cut into 8 or 10 fo lengths before it is hauled to town. Two wood yar have been established, one of them in the Y. M. C. football field. At the wood yards 100 men are ke busy sawing the wood to stove lengths and splitti it to order. The wood is delivered throughout t city at $5 per cord. The county is furnishing mu teams to do the skidding in the woods and trucks haul the cordwood to Asheville. The city is supplyi trucks to deliver the firewood in town.

The whole plan is working splendidly. All t charitable organizations in the city have taken pa in the work. One of them sponsored the auctioni of a cord of wood that had been on display in the cent of town for several days. It brought $50. The loc newspapers have been carrying stories to explain t work of the community wood yard and to create market, at the low price of $5 per cord, for fuel wo which would usually retail at $8 to $10. Suppo for the project has been solicited from the pulpits local churches. Women's organizations have volu teered to prepare noonday lunches for the workm and to help in giving out supplies at the end of the da Through the wood yard the city has avoided the sou kitchen and the bread line and has thus preserved t morale of its unemployed.

From one unit of 11 acres marked for a silvicultur improvement cutting 61 per cent of the timber cubic volume was removed. On a unit of 9 acr where only the saw timber was marked, 53 per cent the cubic volume will be cut. Cuttings on the fore will be continued until April.

Handles used in axes to be placed in tool caches on ne Angeles National Forest, Calif., last year were oiled in linseed oil in order to drive out all moisture nd shrink the wood. The axes were hung before the andles were treated. After the boiling the wedges ere tightened. A great many of the axes were exosed to high temperatures and low humidity throughut the summer season. In the fall practically every x was found to have remained tight on its handle. reviously, serious difficulty had been experienced on he Angeles in getting ax handles to stay in the axes, especially in those stored in hot, dry tool boxes for the summer season.

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Headquarters of the Appalachian Forest Experiment Station and the Pisgah National Forest, and those of the Federal district forest inspector and the State district forester, have been established in the new Federal building at Asheville, N. C., by transfer from the Asheville city hall.

General Forest News

yclone Spark Arrester Passes Test with Perfect Grade

The cyclone spark arrester, developed in the Missoula, Mont., shops of the Northern Pacific Railway, as been found to prevent the emergence of live embers rom a locomotive much more efficiently than a wire etting front-end spark arrester such as has heretofore een used by the local division of the road. The new levice operates on the same principle as the cyclone eparator. The cinders are separated from the gases nd are worn down until they become light enough to eenter the gas stream as it escapes from the stack.

On September 15, 1930, a test run was made from Missoula to Blossburg, a distance of 98.8 miles, in order o compare results obtained with the cyclone spark rrester and those obtained with the master mechanic ront-end spark arrester of 6 by 6 woven-wire netting. A freight train of 81 cars carrying 3,691 tons was made up. An engine equipped with a cyclone spark arrester was coupled to its head end, and 10 car lengths back an engine equipped with a master mechanic front end was coupled in. The coal used in both engines was the very light Rose Bud lignite variety, which has been found to be especially apt to give off dangerously hot cinders through the stack. On the tops of the second, third, and fourth cars back of each engine were placed boxes, made of light lumber, the bottoms of which had been covered with paper toweling fastened down by means of thumb tacks. The boxes were 5 feet long and 11 inches wide, with 8-inch sides and ends and with four 1 by 1 inch baffles placed at uniform intervals on the bottom of each. At a given signal the toweling was exposed for 4 minutes by lifting canvas covers from the boxes. Fresh paper was placed in the boxes after each exposure. Ten exposures were made at various air temperatures and humidities, in winds of varying velocity and direction, and over sections of track varying in curvature. As a result 131 holes and spots were burned in the test paper on cars immediately behind the engine equipped with the master mechanic front end. Cinders from this engine also burned several holes in the clothing of the men on the cars and started one fire on the right of way. Simultaneous exposures of paper on cars immediately behind the engine equipped with the cyclone spark arrester did not result in a single burned hole or even in a charred spot.

John McLaren, fire-control inspector of the United States Forest Service at Missoula, describes the cyclone spark arrester as follows:

> The device is simple and consists mainly of a cylinder made to center below the tip of the exhaust nozzle and to fit snugly around the submerged portion of the smokestack and the exhaust nozzle with a flanged opening at the front. Material coming through the flues from the fire box strikes the outer wall of the cylinder and, after rebounding more or less, passes under the cylinder and up into it through an opening placed tangentially so that material entering the cylinder starts a circular motion without an abrupt change in direction. Once inside, the material continues to rotate against the inner surface of the cylinder and is literally ground down to the size of coarse sand before it enters the gas stream, then escapes to the atmosphere through the submerged smokestack, which extends over and down to within approximately 12 inches of the tip of the exhaust nozzle.

During the past year or so the western Montana division of the Northern Pacific Railway has installed spark arresters of the cyclone type in nearly all its engines.

Two More Lupines Found Poisonous to Livestock

Lupinus laxiflorus and its variety silvicola are definitely poisonous to cattle, the Bureau of Animal Industry has found through feeding tests. When nearly mature fruit of the latter was fed to cattle, horses, and sheep at Salina, Utah, it proved particularly dangerous to cattle. It had slightly less effect on horses and was only about one-tenth as toxic to sheep as to cattle. Cattle and sheep fed with samples of Lupinus laxiflorus obtained from a pasture in Sherman County, Oreg., developed symptoms resembling those produced by the variety silvicola. The bureau is endeavoring through further study to determine more exactly the importance of these lupines as stock-poisoning plants.

At least one dozen species of lupines native to the Western States had previously been recognized as poisonous to livestock.

Parasite Gains on Tip Moth in Nebraska Plantations

Apparently an end of hard times is in sight for plantations of western yellow pine and jack pine on the Nebraska National Forest, Nebr., which have suffered severely as a result of heavy tip-moth infestation. The change is attributed to the parasite Campoplex frustranae, liberated in the plantations in 1925 by L. G. Baumhofer, of the United States Bureau of Entomology. Conditions on certain plots were recently recorded as follows:

Western yellow pine, 2–1 stock, 1915 planting adjacent to Campoplex release plot

Year	Average height (inches)	Average height increase (inches)	Percentage of leaders infested	Year	Average height (inches)	Average height increase (inches)	Percentage of leaders infested
1925	37.3	5.3	86	1928	54.1	6.2	69
1926	44.6	7.3	92	1929	61.7	7.6	33
1927	47.9	3.3	88	1930	72.5	10.8	15

Jack pine, 2–0 stock, 1921 planting, three-eighths to one-half mile east of Campoplex release plot

Year	Average height (inches)	Average height increase (inches)	Percentage of leaders infested	Year	Average height (inches)	Average height increase (inches)	Percentage of leaders infested
1926	40.4	12.8	96	1929	81.6	14.5	30
1927	51.5	11.1	87	1930	104.7	23.1	35
1928	67.1	15.6	84				

On a western yellow pine plot 2 miles west of the parasite release area the decrease in infested leaders has been from 97 per cent in 1927, the worst year, to 72 per cent in 1930.

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Some 3,859,000 trees on the Beaverhead National Forest, Mont., were attacked by the mountain pine beetle during 1930, according to the results of a survey by A. L. Gibson, of the United States Bureau of Entomology. This is 1,353,000 more trees than were estimated to have been attacked by this insect on the Beaverhead in 1929, and brings the total so attacked on that forest in the past four years to 7,000,000. The infestation spread to the Beaverhead from the Bitterroot and Salmon National Forests.

Nomenclature at the Fifth Internationa Botanical Congress

By A. S. Hitchcock, United States Bureau of Plant Industry

In advance of the fifth meeting of the Internationa Botanical Congress, held at Cambridge, England, i 1930, that body's committee on nomenclature receive no less than 20 sets of proposals for modifying th International Rules of Botanical Nomenclature. Th most elaborate of these proposals came from a committee of British botanists. The proposals were printe in a pamphlet of 204 pages. They formed indeed complete revision of the rules, together with additiona nomina conservanda, a proposal list of the standar species of Linnaean genera prepared by A. S. Hitchcoc and M. L. Green (Kew), and other matters. All thes proposals were brought together and codified by Joh Briquet (Geneva), chairman of the committee. The were then printed in a Recueil Synoptique giving i parallel columns first the articles of the present rule and second the various proposed revisions. Thi pamphlet, known as the blue book, consisted of 14 pages. It was distributed to the members of the international committee, who voted on the proposals. Th votes of the committee were returned to Docto Briquet, who brought the results together in the Avi Préalable (the "yellow book"), a pamphlet of 27 pages. At the sessions of the section on nomenclatur the yellow book was the basis for discussion. Nomenclature was considered at half-day sessions throughout one week and at one full-day session. The results wil be published as soon as possible.

The most important action resulting from these sessions was the appointment of an International Committee on Nomenclature, including representatives of all countries publishing on systematic botany. The American members are Barnhart, Fernald, Hitchcock, Jepson, Maxon, Merrill, and Rehder. In order to facilitate the business of the committee an executive committee was appointed consisting of Barnhart, Harms, Janchen, Maire, Ramsbottom, Rehder, and Sprague. This committee is to act on lists of nomina conservanda and several other matters referred to it by the congress. It also will recommend proposals to be presented at the sixth congress, to be held at Utrecht in 1935.

A few of the more important decisions of the Cambridge congress relating to nomenclature are as follows:

The requirement of a Latin diagnosis in publishing new groups was retained. Names published up to 1932 without a Latin diagnosis were validated.

The type concept was to be incorporated into the International Rules of Botanical Nomenclature.

Later homonyms were rejected except as later generic homonyms should be conserved.

The original spelling of names was retained.

The principle of conserved specific names was rejected.

The first international code of botanical names was e Laws of Botanical Nomenclature adopted at the st International Botanical Congress, held in Paris in 67. At the second congress, held in Vienna in 1905, other code (International Rules of Botanical Nomenlture) was formulated, based on the Paris code but odifying it considerably. At the Brussels congress, 1910, the Vienna code was somewhat amended but t much changed. At the fourth congress (Intertional Congress of Plant Sciences), held at Ithaca, . Y., in 1926, no legislative action was taken, but the mmittee on nomenclature which served on the casion of the Cambridge congress was appointed. his committee consisted of the following: J. H. arnhart (New York), G. Bitter (Göttingen) leceased), J. M. Black (Adelaide, South Australia), . de Degen (Budapest), E. de Wildeman (Brussels), . Diels (Berlin), K. Domin (Prague), B. Fedtschenko Leningrad), A. S. Hitchcock (Washington), A. aczewski (Moscow), J. Janchen (Wien), H. Lecomte Paris), H. Lindberg (Helsingfors), R. Maire (Algiers), . E. Moss (Johannesburg, South Africa), S. Murbeck Lund), T. Nakai (Tokyo), C. Ostenfeld (Copenhagen), . Ramsbottom (London), B. L. Robinson (Cambridge, lass.), H. Schinz (Zürich), C. L. Shear (Washington), . A. Sprague (Kew), A. Trotter (Firenze), A. Valeton Leyden), and the four members of the permanent ommittee on nomenclature, John Briquet (Geneva chairman), H. Harms (Berlin) (vice chairman), . Mangin (Paris), and A. B. Rendle (London).

Funds for the use of the international committee on omenclature were solicited in the United States by a ommittee appointed by the National Research Council. his group placed at the disposal of the international ommittee about $3,000 received from institutions and ndividuals.

New Arboretum at Cleveland Provided for by Gift to Museum

A 100-acre tract of land on Sperry Road, near Kirtland, Ohio, has been given to the Cleveland Museum of Natural History for development as an arboretum. The lonors are Mr. and Mrs. Benjamin Patterson Bole and their son, Benjamin Patterson Bole, jr. To develop the new arboretum, which will be known as the Holden Arboretum, the museum will have the larger part of the income from the Elizabeth Davis Holden memorial fund, established by the late Albert F. Holden, Mrs. Bole's brother. Mr. and Mrs. Bole have given the museum an option to buy additional lands on the basis of present values, and will provide funds for preparing the program of the arboretum. The gift and the plan of cooperation between the museum and the trustees of the Holden estate were announced at a dinner in celebration of the tenth anniversary of the establishment of the museum.

Selective Cutting on Little Falls Watershed

By R. R. Fenska, New York State College of Forestry

A logging operation managed according to forestry principles has just been completed on the 4,003-acre municipal forest of Little Falls, N. Y. The operation brought the city a return of $19,226 over and above all expenses. Yield predictions based on growth studies indicate that a similar quantity of timber may be cut from the tract 25 or 30 years from now.

The Little Falls municipal forest is situated on the watersheds of Spruce and Beaver Creeks, from which the city obtains its water supply. It was acquired by the city through a series of purchases dating from 1896.

In 1926 a cruise of the property showed that the 2,100 acres on the Spruce watershed contained nearly 5,000,000 feet of merchantable timber that could be removed with silviculturally desirable results. About two-thirds of this timber was beech, birch, and maple; the remainder was red spruce, balsam fir, and hemlock. The timber was marked for logging under a system of selective cutting. This was so planned as not to jeopardize the influence of the forest in regulating water supply.

The first logs were cut during the winter of 1927–28. Cutting was completed in 1929–30, but on account of poor logging conditions at that time some of the logs could not be hauled away until the winter of 1930–31.

During the first two seasons tractors were used to haul the logs the entire distance of 15 miles to the mill. The route ended with 6 miles of State highway. In the third season the logs were hauled with tractors for the first 9 miles, then reloaded to auto trucks for the haul over the State highway. While tractors were being used for the entire haul, two trips per day was a fair average with about 4,000 board feet, log scale, for each tractor load. By reloading to trucks for the last 6 miles, hauling was speeded up enough to effect a saving of $6 per 1,000 board feet. Logging costs on the operation were as follows:

Seasons 1927–28 and 1928–29

	Per 1,000 board feet
Felling, log making, skidding (horse), and road making	$12
Hauling 15 miles with tractors	20
Stumpage	5
Total cost at mill	37

Season 1929–30

Felling, log making, skidding, and road making	$12
Hauling 9 miles with tractors	10
Hauling 6 miles with auto trucks	4
Stumpage	5
Total cost at mill	31

Labor averaged about $3.50 per day, exclusive of board.

The hardwood logs averaged 10 per 1,000 board feet by the Scribner Decimal C rule, the softwoods 22. Of the total cut, by actual log scale, hardwoods composed 64 per cent and softwoods 36 per cent.

Owing to the character of the topography, this was a difficult logging operation, and the cost was somewhat higher than average.

Forestry and Game Management in Southern Mississippi

By Philip C. Wakeley, United States Forest Service

For 14 years W. W. Kurtz has been developing 2,000 acres of turpentined and largely cut-over pine land in Greene County, southern Mississippi, with the main purpose of building up a quail preserve especially adapted to field trials. In planning to make the property pay he early decided on timber and crude gum as his cash crops. Mr. Kurtz has been eminently successful both in increasing the stock of quail and in obtaining a satisfactory income by conservative working of his woodlands. Protection against fire has been the foundation of his success, but the details of his operation are at once so unusual and so effective that no forester or game manager passing near the tract should neglect an opportunity to observe them at first hand.

Mr. Kurtz's first move was to fence a small area and stock it with cattle, one cow to about 4 acres year long, to wear down the rough and reduce the fire hazard. A burned firebreak protected the pasture. Instead of making the break outside the fence where it would become rough again within the year, Mr. Kurtz made it inside, where the cattle would concentrate on it in the spring and keep the grass down.

After protection was established the grazed area came in first to lespedeza, which is fine forage and excellent quail feed, and soon afterwards to slash pine. As the herd increased and as the slash pine shaded out the grass, Mr. Kurtz fenced additional areas of cut-over land and reproduced slash pine on them in turn by using his cattle to wear down the rough. Meanwhile he chipped young and old trees on other parts of the property and cut old boxed trees for lumber, selling crude gum and logs at near-by stills and mills. Now, 14 years after his start, he is chipping slash pine trees at a profit on what was originally the treeless portion of his first protected pasture. The number of quail has increased enormously, thanks to the abundant food on newly protected areas, fields, lanes, and fences, and to the good cover afforded by the young pine thickets.

The heavy stocking of the pastures (one cow to 4 acres) necessitates the raising of some field crops to supplement the range. Mr. Kurtz raises also a great variety of garden crops and fruit, canning much of the surplus, and buys almost no food. He sells no farm produce. The cattle are merely a link in the chain. Aside from furnishing a moderate quantity food for the family, they serve solely to reduce the fi hazard and to help obtain pine reproduction. Gum an timber are the only cash crops, and they pay well.

Mr. Kurtz's mailing address is State Line, Miss., bu his place is most easily reached from Leakesvill Greene County, Miss., 10 miles to the south. He i keenly interested in up-to-date agriculture, in practica forestry, in all forms of game management, and i field trials.

This operation was first brought to the attention c the Southern Forest Experiment Station by K. E Kimball, of the Mississippi Commission of Forestry.

Petrified Forest Monument Enlarged

A presidential proclamation of November, 1930 added approximately 11,010 acres of land to the Petrified Forest National Monument, Ariz., making its are total 36,918 acres. As enlarged the monument includes more than half of an area in excess of 100 squar miles that is covered by fragments of petrified tree estimated to be 200,000,000 years old. After thes trees had drifted down some prehistoric stream to thei present location, become waterlogged, and sunk, thousands of feet of sandstone was formed over them geologists explain, with the result that the woode trunks were metamorphosed into masses of agate an carnelian. A slow upheaval of the land, and subsequent erosion, finally exposed the petrified logs.

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Mount Rainier National Park, Wash., has been enlarged by about 34,000 acres, through an act of Congress approved January 31. Changes in the southern and eastern boundaries add to the park a portion of the summit of the Cascade Range and other scenic features, and make Chinook Pass the park's eastern gateway. Through this pass will run the new road connecting Yakima and Seattle.

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A regional plan of organization has been adopted by the Bureau of Biological Survey for its pest-control work. Field workers of the bureau who are engaged in cooperative campaigns for the control of injurious rodents and predatory animals are now grouped in four regions, constituted as follows: Region 1, all States east of the Mississippi River, including all of Louisiana; Region 2, Montana, Wyoming, South Dakota, Colorado, and Utah; Region 3, Washington, Oregon, Idaho, Nevada, and California; Region 4, Arizona, New Mexico, Oklahoma, Arkansas, and Texas. The four regional supervisors and their headquarters are as follows: James Silver, Washington, D. C.; Leo L. Laythe, Denver, Colo.; Ira N. Gabrielson, Portland, Oreg.; and Don A. Gilchrist, Phoenix, Ariz.

Foreign Notes

Pinus Radiata as Structural Timber

(From the Australian Forestry Journal, December, 1930)

Many are aware of the unpromising start made in he utilization of the plantations of Pinus radiata or . insignis as it was called. Cut first at a time when oftwoods were in great demand but were almost unrocurable, it was rushed on to the market without any ttempt at seasoning, and naturally was most unsatisactory in its behavior.

The woods and forests department of South Australia rofiting by this initial experience has set itself out o live down this prejudice, and by maintaining sound easoning and utilization methods to demonstrate he true worth of the product from the extensive P. radiata plantations. Kiln dried floorings, lining, nd weatherboards now enjoy an excellent reputation ased on their inherent worth and are recognized as eing far superior to the Baltic they are replacing. Scattered almost throughout the State, there are ouses and buildings framed, sheathed, floored, ceiled, nd lined wholly with P. radiata with the exception of hardwood floor joists and stumps. These are a erfect testimonyof the value of this timber for general uilding uses.

The faith of the department has, however, gone urther and has been justified. With the exception of hardwood stumps the new Mt. Burr sawmill building has been built entirely of sawn P. radiata. To build a sawmill of the class of timber to be converted is so usual as not to be worthy normally of comment. But this mill is something more than an ordinary bush sawmill. The plant is of a type unique in the Southern Hemisphere.

The first feature of note is the use of the modern Swedish gang saw for converting the comparatively small logs directly in one operation to unedged boards. One gang saw is being installed at present, but provision is being made for the inclusion of a second unit, when increasing maturing plantations necessitate a greater mill capacity.

The second feature is the thoroughness of the methods of utilization. The timber, after leaving the gang saw, is edged, docked, sorted, and loaded in segregated lengths onto kiln trucks. It is then transferred to one of a battery of the latest type of internal fan-drying kilns, and after completely controlled drying is transferred once again to the planer. Here it is unloaded directly from the kiln truck to the machine, and is converted to floorings, linings, or weatherboards as desired. The machined boards are then conveyed to the dry storage sheds. Case stock is cut from the mill waste and is handled independently through a separate seasoning kiln to the case sheds.

Naturally a plant of this type has been rather exacting in the class of mill building required, and it is here that P. radiata has shown its true worth. The roof trusses entirely of P. radiata have an unsupported span of over 60 feet. The long wall studs, the plates, the 2-inch flooring with its rebated joints, the heavy mill floor joists, and floor bearers are a definite proof that intelligent design is all that is necessary to secure satisfactory service from this timber. There can be no more fitting refutation of the idea that P. radiata is a timber suited only to the inferior uses.

Scandinavian Forest Fire Insurance Companies Form Union

The Scandinavian Forest Fire Insurance Companies Union was organized in August, 1930, when representatives of Norwegian, Swedish, Danish, and Finnish insurance companies met in the first Northern Forest Fire Congress, held in Oslo. The purposes of the union are to collect information on forest fire protection and insurance and issue it to the member companies and to formulate uniform compensation rules.

The Danish Plantation Insurance Co. has now insured more than 40,000 hectares of forest plantations in Denmark for 16,000,000 kroner. In Sweden several companies, including the largest general insurance companies, have insured approximately 8,000,000 hectares of forest property for about 800,000,000 kroner. Landowners in Sweden who have taken out forest insurance number between 70,000 and 75,000. In Norway the Norwegian Mutual Forest Fire Insurance Co., founded in 1912, has issued policies on 2,000,000 hectares with a valuation of 400,000,000 kroner, the policy holders numbering about 13,000. In Finland the Sampo Mutual Insurance Co., founded in 1914, and the Forest Owners' Mutual, founded in 1916, have issued policies to about 30,000 owners altogether. It is estimated that the forest areas insured have a total area of 2,000,000 hectares and a valuation of about 3,000,000,000 marks.

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Canada produced 8,208,276 pounds of maple sugar and 2,185,379 gallons of maple sirup last year. In quoting these totals the Dominion Government rates 1930 as a good average year in regard to output of maple products. The sugar was valued at $1,381,513 and the sirup at $3,869,107. In 1929 the Dominion produced 11,698,925 pounds of maple sugar and its total output of sugar and sirup was valued at $6,118,856.

Mistletoe Injury to Fir Trees in Switzerland

Writing in the Journal Forestier Suisse, J. Péter-Contesse records some striking instances of deformation and stunting of fir trees in Switzerland as a result of attack by mistletoe. The fir invariably reacts with a hypertrophy of its tissues at and near the point of attachment and development of the mistletoe. As a rule the hypertrophy is rather slight in the case of firs supporting mistletoe having highly developed aerial growth, and much greater in cases in which the parasite's development is limited to roots, "suçoirs," and adventitious buds. Firs supporting mistletoe frequently have a greater diameter at a height of 6, 8, or 10 meters than at the base. One case is known in which such a fir, 50 centimeters in diameter at the base and 41 centimeters in diameter at a height of 8 meters, at a height of 9 meters had a diameter of no less than 80 centimeters.

Frequently the attack by mistletoe reduces height growth to a few centimeters a year or entirely checks it. As a typical example of diameter growth gradually diminished through this cause M. Péter-Contesse describes an isolated fir that grew on fertile soil in environmental conditions entirely favorable for rapid development. The tree was 26 meters in height and had a well-developed crown. Growth of mistletoe on the trunk had been in progress more than 40 years when the tree was cut at the age of 106 years. Only one log of 9 meters at the base could be used for lumber; all the remainder of the trunk was a succession of swellings and constrictions. The diameter varied as follows: At breast height, 49 centimeters; at 12.5 meters, 64 centimeters; at 13.5 meters, 47 centimeters; and at 14.7 meters, 56 centimeters. Increment, which amounted to 6.7 per cent between the ages of 41 and 50 years, decreased until between the ages of 91 and 100 years it was but 0.53 per cent.

One reason for such reduction in rate of growth, explains M. Péter-Contesse, is the fact that the growth period of the parasite does not coincide with that of the host. The mistletoe begins to grow at the end of winter, in February, when the fir is still resting. To compensate the evaporation from its young shoots and flowers and to satisfy its food requirements the mistletoe probably robs the fir of a great part of the reserves, accumulated in the course of the preceding year, which the tree would normally use to sustain itself during the first few weeks of the vegetative period. When the fir begins to vegetate it finds itself "empty." A dry summer invariably results in the death of considerable numbers of the firs that are badly infected.

The missel thrush is identified as the agent of the spread of mistletoe in fir forests of Switzerland. Migrating from the south at the beginning of spring, the thrush arrives in that country at a time when food suitable for its use is scarce. The berries of the mistletoe are available because they are rejected as food by a the indigenous birds. Consequently the thrush live almost exclusively on these berries during its migration and during the first weeks of its sojourn in Switzerland

Shelter-Belt Planting in the Prairie Provinces

More than 6,000,000 tree seedlings and cuttings were distributed by the Canadian Forest Service in 1930 from nursery stations at Indian Head and Sutherland, for shelter-belt planting on farms in the Prairie Provinces Beginning in 1901, the service has distributed 116,000,000 trees for this purpose, to more than 100,000 applicants. Returns of forest inspectors indicate that 80 per cent of all the plantations set out on the Canadian prairies under this plan are now "flourishing and vigorous." The successful plantations cover 32,000 acres in all, or an average of nearly one-half acre each Cuttings and seed from the plantations established with nursery stock are used to start plantings on neighboring farms. Of the 7,600 farms on which shelter-belt plantings were inspected during the past year 6,800 had well-kept gardens, 2,700 had plots of small fruits, and 400 had orchards containing fruit-bearing trees.

New Brunswick University Forest School Occupies New Building

The forest school of the University of New Brunswick, at Fredericton, established 23 years ago, is housed this year in a new forestry and geology building for the construction and equipping of which the provincial government some years ago authorized expenditure of $300,000. In all 15,000 square feet of floor space has been made available for the use of the forest school, including a lecture room accommodating 200 persons, three laboratories each of which contains working space for 32 students, and a 24 by 61 foot drafting room. For the purchase of special equipment required by the school various forest industries in New Brunswick and Quebec have contributed $15,000.

A tract of 3,640 acres of forest land almost adjoining the university campus has been under the care of the forest school since 1908. Through cooperation of the provincial department of lands and mines the school has the use of an experimental nursery and a modern seed-extracting plant.

To date, 96 men have been graduated from the school. The present enrollment is 47.

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A gift of £25,000 was received during the past school year by the Imperial Forestry Institute, University of Oxford, as a contribution toward the institute's building fund, from the Rajah of Sarawak, H. H. Sir Charles Vyner Brooke, G. C. M. G.

Personals

William F. Pickett, assistant professor of horticul-re in the Kansas State Agricultural College, has en named State forester of Kansas, succeeding the te Albert Dickens.

John W. Keller has become deputy secretary of the ennsylvania Department of Forests and Waters. is former position of State highway forester has been cepted by Walter D. Ludwig, a graduate of the ennsylvania State Forest School, who served for an tended period as district forester for the Gallitzin strict, with headquarters at Johnstown, Pa.

Joseph S. Illick, recently State forester of Pennsyl-ania, is under temporary appointment as special cturer in silviculture at the New York State College Forestry, carrying on the work of the late John W. tephen. Professor Illick is a graduate of the Biltmore orest School and of Juniata College, and studied for ne year in the University of Munich, Germany. rior to 1919, when he took up administrative duties the Pennsylvania Department of Forests and Waters, e had 10 years' teaching experience in the Pennsyl-ania State Forest School.

Burt P. Kirkland, since 1912 a member of the for-stry faculty of the University of Washington, has signed to accept appointment to the United States orest Service as principal forest economist. He is ppointed for work in the Pacific Northwest in con-ection with the national survey of forest resources nd requirements. Mr. Kirkland was recently ap-ointed to the editorial staff of the Journal of Forestry, aking the field of forest protection and administration, s successor to E. O. Siecke.

Axel Brandstrom has accepted appointment as enior forest economist in the United States Forest ervice, leaving a position on the forestry faculty of he University of Washington which he has held since 928. His new duties are in connection with the forest urvey in the Pacific Northwest. He is succeeded by ussell Mills, a 1922 forestry graduate of the Univer-ity of Washington who has been connected with the auk River Lumber Co. since 1924 as a logging ngineer.

Charles S. Howard, president of the Howard Auto-nobile Co. of San Francisco, and Ernest G. Dudley, f Exeter, Calif., formerly connected with the United tates Forest Service, have been appointed members of he California State Board of Forestry.

Mrs. Edmund N. Brown, of San Francisco, has been ppointed a member of the California State Park ommission. Mrs. Brown has been active in city nd county park work.

P. A. Herbert, of the forest taxation inquiry of the United States Forest Service, is now a member of the editorial staff of the Journal of Forestry, in charge of the department of forest economics and policy. This place was recently resigned by Ward Shepard.

Stanley C. Clarke has been appointed extension forester for Idaho, effective March 1. He succeeds Otto C. F. Krueger, who after a brief period of service in that position has returned to the United States Forest Service. Mr. Clarke is a graduate of the University of Illinois and has had 15 years' experience as a chemist. Recently he has been studying forestry in the University of Idaho.

Calvin H. Kauffman, professor of botany in the University of Michigan and director of the university herbarium, will retire at the end of the present academic year with the title of professor emeritus of botany and director emeritus of the university herbarium. He will be succeeded by Edwin B. Mains.

Francis H. Eyre has been transferred from the division of silvics of the Washington, D. C., office of the United States Forest Service, with which he had been connected since the early part of 1927, to the Lake States Forest Experiment Station. He joins the experiment station with the full grade of silviculturist.

H. L. Person, since 1927 consulting forest entomologist with the California Forest Experiment Station, is now a member of the United States Forest Service. His new duties have to do with the California station's studies of forest management in the redwood region. Mr. Person received the bachelor's and master's degrees from the University of Minnesota in 1921 and 1922, respectively. His connection with the office of forest insect investigations, Bureau of Entomology, dated from the latter year.

Charles C. McCracken, president of the Connecticut Agricultural College, is chairman of a George Washington Bicentennial tree-planting committee appointed for Connecticut by State Forester Hawes.

W. R. Dunlap, a graduate of the Pennsylvania State Forest School, who for the past two years has been associated with the southern forestry educational project of the American Forestry Association, working in Mississippi and in Florida, is now a district forester of South Carolina, stationed at Walterboro.

H. Y. Forsyth is now a district forester in South Carolina, stationed at Aiken. Mr. Forsyth is a graduate of the Pennsylvania State Forest School and has had experience in State forestry work in Pennsylvania, West Virginia, and New Jersey.

James R. Simmons has resigned as secretary-treasurer of the New York State Forestry Association, after serving in that position for more than 10 years. John C. Sammi, instructor in the department of engineering of the New York State College of Forestry, has been appointed to succeed him temporarily.

Edward D. Freeland has been appointed superintendent of the Wind Cave National Park, S. Dak., by transfer from Carlsbad Caverns National Park, N. Mex., where he had been chief ranger since 1929.

C. Marshall Finnan is being advanced to the super intendency of Mesa Verde National Park, Colo., effective March 16. Mr. Finnan has served for some tir as chief ranger of the park and recently as acting supe intendent.

James E. Gurr, supervisor of the Toiyabe Nation Forest, Nev., has been transferred to the Dixie Nation Forest, in the same State. He succeeds Orange Olsen, who was recently placed in charge of fish a game work in the Ogden, Utah, regional office of t United States Forest Service.

Walter U. Gartska, a 1930 graduate of the Ya School of Forestry, is now an instructor in the Pen sylvania State Forest School.

Bibliography

New Book on Forest Resources of the World

By W. N. Sparhawk, United States Forest Service

A great quantity of statistical and other information regarding the forests of various countries, particularly in Europe, has become available during the last 10 years. Two Finnish authors, Lauri Ilvessalo and Matti Jalava, have brought much of this information together in a recent publication [1] which, fortunately for American readers, contains a summary in English. The general results and conclusions differ very little from those stated by Zon and Sparhawk in Forest Resources of the World, published in 1923, although the figures given by the Finnish authors for many individual countries are quite different from those appearing in the earlier work. The most important differences are in the figures for Russia. The new volume shows approximately 125,000,000 acres less forest in the Soviet Union, with 200,000,000 cubic meters less annual growth and 37,000,000 cubic meters smaller annual cut in European Russia. No estimate of growth and cut is made for Asiatic Russia. On the other hand, somewhat larger forest areas are given for Finland and Sweden, which have recently completed nationwide forest inventories, and the figure for total annual growth in each of these countries is increased by more than 25 per cent.

Among other conclusions the authors state:

> Although the world's forest supply is still very plentiful, and by exhausting this supply the demand for wood can still for a long time be filled, it is observed that the use of the total forest reserve is almost impossible due to its inaccessibility and that the accessible forests are not inexhaustible. * * * The wood market has been overflooded lately, and this has given rise to the false opinion that the wood supply is abundant. The overflooded wood market is not the resu of an excessive forest supply, but rather the result the poor economic conditions in many States whi have made it necessary to use the reserved forest * * * Humanity can evidently not get along wit out wood. If the world's future demand for wood going to be filled, rational forest care and cultivati must replace the present wasteful use of the forests.

Forests of Finland

By W. N. Sparhawk, United States Forest Service

The results of the general survey of the Finnis forests have been published in three volumes, in whic the data were treated by provinces and by maj watersheds. In order to localize the information sti further, the Forest Research Institute has now pu lished a volume [2] giving the details by minor subdiv sions. As the distance between survey lines rendere it impractical to use small watersheds or political unit the country has been subdivided into 78 units more less homogeneous in fertility. For each unit are show in tables and charts the percentages of good and po forest, waste land, and cultivated land; producti forest by types; swamp forest by types; composition the forests by species and age classes; average growi stock and actual and potential growth per hectar and extent and ownership of cultivable land, by fore types. Considerable attention is paid to the matt of cultivable land because of its bearing on the futu productive forest area. It was, of course, impractic to make an intensive land classification. In estima ing the cultivable area, the principal index was t forest type (i. e., character of surface vegetation), wi allowance for stones, topography, possibility of econo ical drainage, etc. Of the total uncultivated land Finland 16.6 per cent is considered fit for cultivatio e percentage of cultivable area is much higher for mp land (32 per cent) than for uplands (7.7 per t), probably because most of the usable upland is eady occupied.

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[1] Maapallon Metsävarat. 407 pp. Reprinted from Communicationes ex Instituto Quaestionum Forestalium Finlandiae Editae. Helsinki, 1930.

[2] Ilvessalo, Yrjö: Suomen Metsät Viljavuusalueittain Kuvattuin (The Forests of Finland Described by Areas of Fertility.) Reprint fro Communicationes ex Instituto Quaestionum Forestalium Finlandi Editae 15. Helsinki, 1930.

Visconsin Presents Results of County Land-Use Surveys

By Ronald B. Craig, United States Forest Service

Any forester concerned with problems of land use l economics will do well to study a circular entitled laking the Most of Marinette County Land" and culars of parallel title dealing with Ashland and ylor Counties, published by the Agricultural Exten-n Service of the University of Wisconsin. The three olications appeared in 1929, 1930, and 1931, respec-ely. Each is an excellent review of an analysis of unty "assets and liabilities" made as a preliminary ort toward solving county land-utilization and reve-e problems. The text of each is admirably supple-nted with tables and charts showing land utilization, l types, class of land ownership, location of agricul-al and forest industries and public utilities, recrea-nal development, tax delinquency, etc. While the tistical data presented will be of interest only to ose concerned with conditions in the Lake States, e survey methods illustrated may well be adapted to idies of the best use of land in other regions.

Forest land makes up a large part of Marinette ounty; agricultural land and mineral land predom-ate in Ashland County; cut-over, waste, and swamp nd compose 58 per cent of the area of Taylor County. l three counties derive a large portion of their present venue from dairy and agricultural products. Tax linquency is high in all three, especially in the towns rthest from railroads. The Marinette County report ows the need of reorganizing land utilization, chiefly rough a shift from cultivation of submarginal ricultural land to development of forest land so at it will support local wood-using industries. In shland County, on the other hand, agriculture is pro-essing favorably and the major problems have to do ith forest management and with mineral develop-ent. In Taylor County, with its large proportion of it-over and waste land, the problem is chiefly a mat-r of Federal, State, or county purchase of lands iysically or economically unsuited for agriculture and ie creation of public forests from such lands. Tax-elinquent lands on which Taylor County has already ken title or will soon do so might well form the iclei for a series of county forests. In all three eports the need of additional public forest domain is ressed, as well as the need of consolidating school istricts and, on certain areas, consolidating farming nits on fine agricultural soils.

Some errors are noted. On page 10 of the Mari-ette report the figures shown for milk production in 920 and in 1925 indicate an increase of 34 per cent, but the text states that the increase was 35 per cent. In both the Ashland County and Taylor County reports the circle graph showing farm income is faulty in that a sector greater than one-half is labeled simply "milk," with no indication of the fact, shown by figures given elsewhere on the page, that it represents income from sales not only of milk and cream but of butter, cheese, ice cream, and other dairy products. The Marinette report would have been improved by a graph showing the sources of gross farm income and by a map showing the location of the county with reference to other parts of the State. Both these features are included in the Ashland County report. The Ashland and Taylor County reports show in general the improvement in presentation of data that might be expected in later efforts.

Since these studies were preliminary in character, the suggestions made for improving conditions of land utilization and income are necessarily general rather than specific.

What Florida Offers the Pulp and Paper Manufacturer

By Ronald B. Craig, United States Forest Service

An interesting bulletin [3] by Harry Lee Baker, State forester of Florida, and William L. Wilson is designed to present to manufacturers of pulp and paper throughout the United States the advantages which Florida possesses for this industry. The authors consider in detail the four factors which they regard as determining the development and expansion of paper manufacture in the State. These are (1) the kinds of pulp that can be manufactured from Florida wood, and the demand for such pulps; (2) the competition from other regions, on the basis of cost of production; (3) the availability of the materials and facilities essential for converting wood into pulp and paper; and (4) the availability of timber resources sufficient to keep pulp mills running for an indefinite period of time.

C. E. Curran, chemist of the United States Forest Products Laboratory, is quoted to show that southern pine, in addition to being suitable for manufacture into kraft paper, can by means of processes recently developed be used, either alone or in combination with gum and other hardwoods, to make newsprint, book paper, and bond. Figures are presented indicating that in the last decade domestic consumption of kraft pulp has increased at the rate of 233 per cent, whereas imports of kraft pulp have increased but 100 per cent.

In respect to both of "the principal cost factors for any prospective pulp mill enterprise to consider," cost of raw materials delivered at the mill and cost of transporting the finished product, the report shows that there is a decided differential in Florida's favor. "Pulpwood at the mill in Florida costs less than one-half the average for the United States. With transportation charges added, Florida producers of paper can lay down their product at New York much cheaper than can northern producers, the differential for kraft paper in favor of Florida kraft products being estimated in 1930 at $6.56 a ton." The raw materials other than timber that are necessary for the manufacture of pulp and paper, namely, salt in various forms, sulphur, rosin, lime, and clay, are all readily available in Florida. Supplies of pure water are abundant. High-grade coal from Alabama and oil from Texas and Mexico can be delivered at Florida ports at low cost. Hydroelectric possibilities are of the highest order.

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[3] Possibilities of Pulp and Paper Making in Florida. 36 pp. Florida Forest Service Bulletin No. 3. Tallahassee, Fla., 1930.

The depletion of coniferous timber in the Northeastern States and the fact that imports from foreign countries can not be counted upon with certainty to supply our pulpwood requirements are mentioned as favoring utilization of southern pines, notably slash and longleaf, for pulp. The authors quote a 1924 estimate of the United States Forest Service placing the volume of southern pine suitable for pulp at about 940,000,000 cords, more than four times the total stand of northern spruce, fir, and hemlock. According to Forest Service figures the pulpwood yield of longleaf pine and that of slash pine are about 11 and 22 times, respectively, as great as that of spruce in the Northeastern States at 30 years of age, and at 60 years exceed that of spruce by 15 and 24 cords, respectively, per acre.

A brief discussion of Florida's extremely favorable taxation system is included, stressing the point that under a State constitutional amendment effective from July 1, 1929, through 1948 any paper or pulp mill established in Florida on or after the former date will be exempt from taxation for 15 years after establishment.

The bulletin gives evidence of hasty preparation, and would have benefited by more careful proofreading.

Several of the authors' statements are open to question. While no one can question the great advantage of the southern pines over spruce in rate of growth, the bulletin is at fault in implying that spruce, fir, and hemlock are the only species on which northern pulp manufacturers can depend either now or in the future. As a matter of fact, the new processes which have made possible the production of a better grade of paper from southern pines and the utilization of southern hardwoods for pulp manufacture have also made possible the manufacture of pulp from northern hardwoods, notably aspen, red maple, and beech. It is stated (p. 32) that "in the heart of the spruce pulp region of Canada and over much of the New England States spruce does not adequately restock the land, and such reproduction as does come in has strong competition from overshadowing hardwood reproduction." While spruce reproduction is undeniably inadequate on certain areas, particularly after fire, such areas compose only a small portion of the spruce land of the Northeast. As a rule spruce reproduction forms a dense pure st of from 1,500 to 2,000 trees per acre, which, barr fire and insect damage, ultimately develops into a stand of pulpwood.

This presentation of Florida's advantages for paper industry will be of interest to all foresters; th can be no question that the region's possibilities, developed, will have a profound effect on forestry a the forest industry not only in the South but in t North as well. The authors are to be commended their very convincing argument.

Alignment Chart Volume Tables

By F. X. SCHUMACHER, United States Forest Service

The construction of a volume table, which giv average or estimated tree volume for given dimensio is based upon a correlation analysis of volume wi diameter and height. Volume tables have oft been constructed on the assumption that we kn nothing of the laws of relationship of volume to dime sion in regular geometric solids, such as the parabol or the cone. Now, tree form approaches the form these solids. Therefore it is perfectly logical to comp volume of trees of given dimensions with volume known solids of the same dimensions and, by focusi attention upon the difference between them, make t appropriate corrections to the volume of the solid order to arrive at the volume of the tree.

The added work involved through such compa son might outweigh the advantages, as sometim happens in the use of the usual form-factor method constructing volume tables, were it not possible to s up the volumes of the solid in alignment chart for The alignment chart renders interpolation and volu correction easy, as both are graphic.

A number of base alignment charts have been p pared by the office of forest measurements, Unit States Forest Service. There is available for free di tribution a limited supply of charts as follows:

Unit used	Range in—		Volume included
	D. b. h. (inches)	Total height (feet)	
Cubic feet	60	200	Entire stem.
Do	60	200	To 4 inches top d. i. b.
Board feet (Scribner)	30	120	To 8 inches top d. i. b.
Do	30	120	To 10 inches top d. i. b.

A publication describing the method of constructi volume tables by the use of these charts is project by the Forest Service, and in the meanwhile copies of manuscript describing it are being lent to responsib foresters. By the use of this method, the servi claims, a more accurate table can be constructed with given quantity of data in a shorter time or, conversel able of given accuracy can be constructed with data m fewer trees.

This claim is quite valid. But faulty interpretation it may lead to grave error. We can not substitute provement of technique for adequacy of sample and ll expect to arrive at the desired end result—a good lume table of more than local application. To illus-te: Suppose we construct a volume table from 100 es of second-growth red gum taken from two or three ntiguous acres. We may be sure that the aggregate bular volume will agree with the basic tree volumes to raction of 1 per cent. But we have no assurance that table will apply to a second-growth red-gum type miles away.

Let us consider an analogy. Suppose some one eding a reliable estimate of a township of timber akes a 100 per cent cruise of 1 acre and multiplies the re volume by the number of acres in the township. ould we agree that the township was properly uised? Indeed we would not, even should we know at the acre cruise was absolutely correct. We should alize that the principle of sampling had been violated. ne township ought to be sampled by cruising enough res, well distributed, to arrive at a satisfactory mple error.

The same principle of adequate sampling is just as nding in the production of a volume table that is signed for more than simply local application.

he Case of the Second-Growth Southern Pine

By D. B. Demeritt, Pennsylvania State College

Nearly a decade ago the Southern Pine Association rnished the National Research Council with funds to art a study of the growth of the commercially impor-nt Southern pines. Most of the field work of this udy was done by the Southern Forest Experiment tation. The results appeared in 1929 as Miscellan-ous Publication No. 50 of the United States Depart-ent of Agriculture. Too technical for the lay reader, is early publication has been followed with a circu-r[4] by R. D. Forbes and Donald Bruce, entitled "Rate f Growth of Second-Growth Southern Pines in Full tands," which is an excellent popular presentation of e case for timber growing in the southern pineries.

In the South at the present time 12,000,000 acres of ld-growth forest remains, more than 70,000,000 acres f land is fully or partially stocked with second-growth imber, and 30,000,000 acres of forest land is cut over ut not restocked. Annually about 1,300,000 acres of ine lands are being added to the last-mentioned class, ith no seed trees and no hope of natural regrowth. bout half the lands classified as restocked support tands of cordwood size or less. Each year about 5,000,000 trees of the second-growth stands are damaged or killed by the combination of turpentining and woods burning that is being practiced in longleaf and slash pine stands in the Southeast.

The three primary uses for the cut-over pine lands of the South are farming, grazing, and timber growing. Small areas with special advantages such as good climatic conditions or good transportation facilities offer promising possibilities for farming. On the other hand, the Bureau of Soils believes that 23 per cent of the southerly part of the Coastal Plain is hopeless for agricultural development and that the soil on an additional 15 per cent is likely to prove for the most part very inferior for farming. In the Southern States the grazing industry, which formerly flourished there, has "fallen on evil days." Despite the mildness of the climate, losses of range livestock from exposure have been comparable to those in many other important stock-producing regions of the United States. Heavy losses have resulted also from disease and from the action of parasites. "It seems entirely possible to reorganize the stock industry of the South by such measures as prevention of fires, fencing of the range, production of winter feed, and introduction of scientific feeding and breeding methods." Even so, grazing and farming combined must be inadequate as a general solution of the problem of the cut-over pine lands.

The discussion of timber growing brings out the ease of natural reproduction of the southern pines and other favorable natural conditions, and then some of the obstacles, including fire, taxation, competition of virgin timber, and the average American's lack of acquaintance with facts regarding timber growing. As examples of timber-growing projects that have succeeded in spite of these obstacles, stories are told of how a Georgia farmer has for 20 years so handled a shortleaf pine woodland as to obtain a cut of sawlogs every 3 to 5 years and how a lumber and pulp company is managing 425,000 acres of land in Louisiana and Mississippi for sustained yield.

A point of interest is the fact that southern pine manufacturing industries employ 20 per cent of the industrial workers of the region and produce 9 per cent of the region's industrial products by value. These industries' investment in sawmills, logging railroads, equipment, and stumpage, exclusive of lands, amounts to approximately $1,130,000,000, and the taxes they pay annually total nearly $15,000,000.

Since 1909 the cut of southern pine lumber has been slowly declining. In part, however, this is a paper decline; the increase in number of small portable sawmills has made it difficult to obtain an accurate account of all the lumber cut. The output of portable mills in second-growth shortleaf stands is a matter of amazement to operators of large mills who have been "contemptuous of second growth."

The contempt with which users of southern pine have regarded second-growth timber has been based partly upon the fact that some second-growth saw logs have come from stands that were too open to produce clean stems. In many cases the logs have been poorly sawed and often the lumber has been imperfectly dried and has not been graded. Stain and other defects have given this lumber an unenviable reputation in many quarters. Logs from stands grown under good forest management, on the other hand, if carefully manufactured produce lumber of very serviceable grades.

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[4] U. S. Department of Agriculture Circular 124. Copies may be btained free of charge, as long as the supply lasts, from the Office of nformation, U. S. Department of Agriculture, Washington, D. C.

The latter part of the bulletin is given over to the presentation of volume, yield, and stand tables, each accompanied by a full and detailed explanation of technical terms. The method of using the tables is explained with considerable care. For more detailed and more technical information regarding their construction the reader is referred to the earlier report on the same study.

Yield tables show yields in 5-year periods for height-sites from 60 to 120 feet by 10-foot site-index classes. The manner of applying these tables to a given stand is ably explained. After the quality of the site is once determined, the timber-producing power of the land can be gotten from these tables. When a decision has been made as to the product to be grown, growth calculations may be made for the most profitable rotation for full or partial stands. The yield tables serve also as a guide to good thinning practice and to partial determination of fire damage.

The study shows that the four chief southern pines "rank among the most rapidly growing commercial trees of the United States." Production of cordwood on a 20-year rotation in full stands on average sites shows the following yields: Slash pine, 36 cords per acre; loblolly pine, 28 cords per acre; shortleaf pine, 18 cords per acre; and longleaf pine, 15 cords per acre.

The publication of this circular makes available to the southern timber grower information of paramount importance. In the past the lack of exact knowledge of the growth rate and possible yields of southern pines has undoubtedly retarded the practice of even crude forestry by southern landowners.

Empire Forestry Handbook, 1930

The Empire Forestry Handbook, 1930, published by the Empire Forestry Association, contains lists of the forest officers in all parts of the British Empire, departments and institutions dealing with Empire forestry, higher forest schools, and forest research institutions. The program of work under way at each institution is outlined. A feature of interest to American wood users is a list of standard trade names and botanical names of more than 200 species of commercially important timbers produced in the Empire. This list was prepared by a committee of the association at the request of the British Empire Forestry Conference of 1928. It is intended that the list shall be revised from time to time and that the names shall be adopted as standard in all branches of the timber trade throughout the Empire.

Releasing and Weeding in New Englar

By E. E. Carter, United States Forest Service

Enthusiastic support for the practice of girdli worthless hardwoods so as to release spruce and otl conifers is given in a report of a special committee the New England section of the Society of Americ Foresters. This committee reviewed the availal data on the subject, concluded that the value of t practice as a business undertaking has been well de onstrated, and in their report fairly lash the forest of the region for inactivity in "the most profitable fie of silvicultural operations" especially in spruce-har wood mixtures which are to be logged for pulpwood about 10 years. The report summarizes the data costs of weedings and release cuttings to favor conife in young stands and strongly advocates such operatio for New England conditions, especially on sites w suited for conifers.

The possible use of hardwoods for pulpwood recognized, but "even under the most intensi utilization of hardwood there will always be a legitima place for girdling" to stimulate the growth of spru and other conifers.

Edward S. Bryant is chairman of the committe The other members are Baldwin, Hawkins, Hosle Toumey, and Westveld.

The Forest Service: Its History, Activities, and Organization

By Herbert A. Smith, United States Forest Service

The Institute for Government Research, a divisio of the Brookings Institution of Washington, D. C seeks "to aid constructively in the development sound national policies." Its lengthening list of pul lications includes a series of "service monographs of th United States Government." The common forewor of the monographs sets forth that no undertaking i this country, and few if any in the world, approach i magnitude, complexity, and importance that of th United States Government; that this vast organization has never been studied in detail as an administrative mechanism; and that to lay the basis for such study the Institute for Government Research ha undertaken a detailed description of each of the distinct services of the Government. A 268-page volum on the Forest Service has taken its place as number 5 in this series.

The body of the text of this monograph consists c three chapters, headed "history," "activities," an "organization." These three chapters occupy 12 pages, as against 146 pages occupied by six appendixe and an index.

The initial chapter, "History," exceeds the other both in bulk and in significance. It is a marvel o condensation and accuracy. The chapter is in effec not only a history of the establishment and develop nt of the Forest Service but a history of the forest icy and activities of the Federal Government from beginning. It is the product of detailed independ- research, not a compilation or rewrite of informa- derived from secondary sources; and for authori- iveness combined with brevity it has no rival in lier work dealing with the subject.

The narrative does not profess to cover the general estry movement in the United States, as such. It nfines itself pretty strictly to events recorded in cial documents, without attempting to seek out uses or deal with the forces that gave the movement namic quality. The effort for forest conservation the United States has been made dramatic by per- alities, contending interests, clashes of sectional ys of thought, changing public opinion. Of such ngs this history gives little hint. The informed der will be reminded of much that is not men- ned; but he will find nothing that misleads, nothing at is inexact, and little indeed that could well have en left out.

The chapters on "Activities" and "Organization" less clear-cut. The former crowds 30 pages with ecifications regarding the great variety of things that e Forest Service does, but it is more of a catalogue an a coherent, well-balanced account of organic nctioning—and, at that, a catalogue with many ps. Similarly, the chapter on "Organization" indi- tes how the Forest Service units and subunits are lated and officered and what character of duties each rforms, but it does not treat the service as a work- g mechanism contrived with a view to the efficient scharge of specific difficult tasks. The chapter sup- ements and to some extent clarifies what was brought it under activities, while to some extent also vir- ally duplicating it.

The first appendix, "Outline of organization," tabu- tes the positions and corresponding salaries in the veral units and subunits of the organization as of ovember, 1929. In the nature of the case such a bulation soon becomes out of date. Appendix 3 ves a short account of the various kinds of publica- ons that have been issued by the Forest Service, with lustrative titles. Appendix 4, "Laws," reproduces e text of many of the acts of Congress relating to the orest Service and its work, from 1876 to 1930. In pite of some omissions it will be useful for reference urposes. Appendix 5 covers Forest Service appro- riations from 1891 to 1930, expenditures for the fiscal ears 1927–1930, and national forest receipts from 1905 o 1929, inclusive. The final appendix is a miscella- eous list, nearly 50 pages long, of books, pamphlets, nd periodical articles, of widely varying significance, elating to the service and its work. A typographical rror causes the title of Ise's important book on the nited States forest policy to appear under the dis- uise of "United States forest police."

The monograph was not planned to make lively reading; and limitations of field and method have prevented it from having the value it might have had as a contribution to the study of the Federal establishment. Nevertheless, as a reference book it will find wide usefulness. Students of governmental conservation activities will give it hearty welcome. For the general reader wishing to inform himself on what the Forest Service field of work is and how it is covered, the monograph provides a carefully prepared, condensed, and, on the whole, authoritative account that fills a place never before occupied.

Up-to-Date Directions for Preventing Termite Damage

By V. L. Harper, United States Forest Service

To many of us, old buildings under which the wooden foundations have crumpled are a familiar sight. On first thought one is inclined to blame fungi for the rotlike damage; frequently, however, a little digging around the foundation discloses numerous antlike insects making their home in the débris, and it is not hard to establish the fact that these insects have been intimately connected with the crime. In Farmers' Bulletin No. 1472, Preventing Damage by Termites or White Ants, T. E. Snyder describes the identifying characteristics of these wood-destroying insects and their habits—particularly their bad habit of eating everything from revenue stamps and old shoes to the walls and foundations of houses—and gives the latest information as to methods of preventing termite damage. This publication first appeared in 1926, superseding Farmers' Bulletin No. 1037, White Ants as Pests in the United States and Methods of Preventing their Damage. It has been issued in revised form [5] under the date June, 1930.

No less than 44 species of destructive native termites are distributed through the United States. Two types of termite are recognized: The subterranean, which requires direct access to moisture and hence works only in materials that are in contact with the ground, and the nonsubterranean, which is capable of working in furniture, woodwork, etc., without direct access to moisture. The second type is found in the warmer regions only of the United States, which partly accounts for the fact that by far the greatest damage from termites in this country occurs in the South and in the Pacific coast region.

The only way to give untreated woodwork effective and permanent protection from attack by subterranean termites, says Doctor Snyder, is to insulate it completely from the ground. It is recommended that foundations of buildings, including basement pillars, be constructed of stone, brick, concrete, or concrete and metal. If the use of these materials is impracticable, the substitute should be timber impregnated with coal-tar creosote. In regions where nonsubterranean termites are common it is suggested that interior woodwork, furniture, etc., be impregnated with zinc chloride, bichloride of mercury, sodium fluoride, or some other effective preservative. In case of slight and localized damage by nonsubterranean termites the damaged wood should be removed and replaced. Where wood has been seriously damaged but not structurally weakened the infested wood should be saturated with orthodichlorobenzene.

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[5] Copies may be obtained free of charge, as long as the supply lasts, from the Office of Information, U. S. Department of Agriculture, Washington, D. C.

In preparing the 1930 edition of the bulletin Doctor Snyder eliminated the recommendation of hydrocyanic-acid gas as a means of destroying nonsubterranean termites. Also, in cases in which it is not practicable to apply orthodichlorobenzene to wood infested with this type of termites he now recommends that holes be bored in the wood with an auger and dry Paris green blown into them. (In using this poison great care should of course be taken to avoid breathing or swallowing any of it.) The distribution map in the revised edition shows the northern limit of damage by subterranean termites as well as that of damage by the dry-wood variety.

An illustrated bulletin on Termites and Termite Damage was issued in 1930 as Circular 318 of the California Agricultural Experiment Station. In California a termite investigations committee formed by various industries and the University of California, and including representatives of the Federal Department of Agriculture, has been at work for more than two years.

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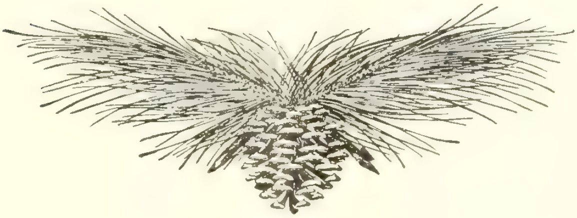
FOREST WORKER



May, 1931

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Announcements

German Forestry Society Holds Annual Meeting in Vienna

The German Forestry Society is holding its large annual meeting this year in Vienna from August 30 to September 7. The first three days will be given up to forestry papers. The meeting will conclude with forest excursions to the silviculturally important districts of Austria and Bavaria. Forestry machines and tools for wood cutting, transportation, soil cultivation, and insect control will be exhibited on September 2. As is the case every year, writes Forstmeister J. A. von Monroy, it will be a pleasure to the German Forestry Society to be able to welcome foreign guests. Further information may be obtained through the foreign committee of the German Forestry Society, Berlin SW 11, Dessauerstrasse 26/III.

Range Research Conference

The Ecological Society of America is sponsoring a meeting for discussion of range research with particular attention to methods. The dates chosen are August 17–20, 1931, and the meeting place is the Great Basin Branch Station of the Intermountain Forest and Range Experiment Station, at Ephraim, Utah. Opportunity will be given for field discussions and demonstrations. The committee in charge consists of C. L. Forsli (chairman), H. C. Hanson, Walter P. Taylor, and G. McGinnies (secretary). Any inquiries in regard the meeting should be addressed to Doctor McGinn at the University of Arizona, Tucson, Ariz.

Exchange of Tree Seed Desired Philippine Forestry Bureau

The Philippine Bureau of Forestry is interested obtaining seed of all tropical and subtropical conife casuarinas, cycas, palms, etc., for planting in the Mak ing National Botanic Garden at Los Baños, Lagu P. I. Arthur F. Fischer, director of the bureau, in communication to the Chief of the United Stat Bureau of Plant Industry, lists 100 species of trees which he will be glad to send seed to the United Stat in exchange for seed of trees desired for introducti into the Philippines. Among the latter he li Chamaecyparis lawsoniana, Cupressus arizonica, C pressus sempervirens, Juniperus communis, Juniper virginiana, Thuja occidentalis, Libocedrus decurre Picea orientalis, Pinus caribaea, Pinus edulis, Pin ponderosa, and other conifers typical of the southe United States and of Mexico. It is suggested th persons interested in exchanging seed with Direct Fischer correspond directly with him at Manila, P.

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FOREST WORKER

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State Forestry

Reforestation Law Approved in Washington

Following approval at last fall's election of an mendment to the Washington State Constitution uthorizing enactment of special forest tax legislation, reforestation measure has passed the legislature and been approved by the governor. The new law proides that cut-over lands classified by the State forest board as reforestation lands shall be assessed at a flat ate of $1 per acre if west of the Cascades and 50 cents er acre if east of the Cascades, and that timber prouced on such lands shall be subject to a yield tax of 2½ per cent when harvested.

Utah Land Board Given Broad Authority for Flood-Control Measures

The State Land Board of Utah has recently been iven authority to take measures calculated to go a ong way toward preventing and controlling floods. he legislation conferring this authority also directs eorganization of the board, replacing its ex officio membership with an executive secretary and two per iem associate members.

The amended law defining the board's functions mpowers it to make surveys of areas in Utah where oods have occurred or are likely to occur and directs to "take immediate action such as it may deem ecessary to control and/or to prevent the occurrence f such floods." Authority is given for employing xperts to make flood surveys. The flood-control measures authorized include engineering works, acquiition of lands needed for flood prevention by purchase, xchange, lease, gift, or condemnation, and regulation f grazing lands. The board is given the duty of ooperating with the sheriffs of the various counties in xtinguishing and preventing fires on watershed lands nd is authorized to employ men to patrol watershed ands. It is authorized also to cooperate with the Federal Government in acquiring lands on watersheds hat are approaching a barren condition as a result of vergrazing and "to take such steps and actions as it may deem necessary and sufficient to prevent said ands from becoming barren so as to cause floods, and to promote revegetation of the said lands." The board "may in its discretion limit the number and kind of stock that may be grazed each year on any State land leased for grazing purposes and may stipulate the number of days that such land may be grazed."

The recent enactment also authorizes the appropriation of funds for flood-control works and for the purchase, lease, patrol, revegetation, and survey of lands for flood prevention and control.

State Forest and State Park Purchase Program Suggested in New Jersey

Nearly 2,000,000 acres of New Jersey's total area of a little more than 5,263,000 acres is wild land, and the acreage of wild land in the State is increasing, the State board of conservation and development points out in recommending to the legislature a 10-year program for acquisition of State parks and State forests. About 1,500,000 acres of the wild land is unproductive at the present time. To rehabilitate this waste land would not involve the difficult problems of irrigation, flood control, or drainage involved in reclamation projects in other parts of the country. "If given proper care and help it can all be made useful, profitable, and beautiful within 50 years and much of it within 25 to 30 years."

State forests and State parks now established in New Jersey aggregate 45,996 acres only. The State has but 10 acres of organized public reservations per 1,000 inhabitants. This figure is compared by the board with figures for New York, Minnesota, Wisconsin, Pennsylvania, Michigan, Vermont, New Hampshire, and Massachusetts, States having from two to twenty times as great forest and park areas in proportion to population as New Jersey. In New York, Minnesota, and Wisconsin State-owned lands of this character total 207 acres, 183 acres, and 170 acres, respectively, per 1,000 inhabitants.

The board recommends an increase of State forest and State park area by 69,245 acres in north Jersey and 273,777 acres in south Jersey, and the creation of five seashore parks totaling 765 acres. With the additions outlined the State would have 17 parks and 10 forests. The prospective cost of the 343,787 acres the purchase of which is recommended is estimated at $7,593,500. For the coming fiscal year the board requests an appropriation of $730,000 to make possible the beginning of the purchases suggested.

Maryland Purchases 6,000-Acre State Forest

A new State forest of 6,000 acres has been acquired by Maryland in Garrett County, by purchase from the Manor Mining and Manufacturing Co. The tract extends from Wallman to Schell on the Potomac River and up the slopes of Backbone Mountain. Mike Tasker, a forest warden of more than 15 years' experience, has been placed in charge as resident warden.

Other State forests in Garrett County are one of 17,000 acres in the Savage River section and one of about 4,000 acres in the Swallow Falls area. With smaller units in six other counties, Maryland's present total State forest area approximates 33,000 acres. Small tracts under option for purchase as State forests aggregate about 7,000 acres.

High Rock Tract Given to Connecticut as State Forest

The family of the late Harris Whittemore have presented the High Rock tract to the State of Connecticut, for park and forest purposes. This is an area of approximately 2,000 acres of hill country on both sides of the Naugatuck River, near Beacon Falls. A pleasure park was formerly maintained at this point by the New York, New Haven & Hartford Railroad Co., and trails which were made at that time leading to the summit of the cliff known as High Rock are still usable. Mr. Whittemore, who served for many years as a member of the Connecticut Park and Forest Commission, began acquiring this area soon after the war with the intention of presenting it to the State. The State park and forest commission has designated it for the present as the High Rock State Forest and intends when appropriations permit to develop portions of it as a park.

A lookout tower is maintained by the State on the hill east of the river, and 30 miles of firebreaks were cleaned out last winter. Several hundred acres of pine and spruce plantations established on the area shortly after a destructive fire in 1922 have prospered and are about to obliterate the signs of the fire.

◆

New York State funds to the amount of $42,682.93 were recently granted to 20 counties as aid in reforestation, under the law of 1929 that authorizes the State to match county appropriations for reforestation purposes to a maximum of $5,000 per county per year. The 20 counties certified that they appropriated $59,178 for reforestation purposes during 1930.

New Hampshire Society Announces Seri
of Public Forest Acquisitions

Title to the Binney Pond property in New Ipswic
N. H., now rests in the State, announces the Societ
for Protection of New Hampshire Forests, which w
active in soliciting contributions toward the purcha
price of $3,000. This 90-acre property is located
the Wapack Trail, which extends 20 miles northwa
from Mount Watatic, immediately south of the Ma
sachusetts-New Hampshire boundary. Old-growt
pines and hemlocks intermixed with spruces cover abo
half its area. The property becomes a wild-life refug
and the Appalachian Mountain Club has the privile
of establishing a camp on the shore of Binney Pon
which is the only body of water along the Wapac
Trail.

Several new forest reservations along New Hampshi
highways are announced by the society, bringing t
total of such reservations in the State close to 10
Three miles of roadside woodlands have been given
Keene, N. H., and neighboring towns by F. L. Care
in the last days of his term as mayor of Keene. The
woodlands, located for the most part upon the Dar
mouth College and Franklin Pierce highways, are nev
less than 100 feet in depth and in some places widen
300 feet. At Mayor Carey's invitation Jules G. Lev
of New York City, is giving a tract one-fourth mi
long on the Franklin Pierce highway. On the Dar
mouth College highway 4 miles north of Keene,
Gilsum, roadside areas are being transferred to tow
ownership by Walter R. Kirk and Harry A. Pierce.
tract wooded with hardwoods interspersed with pin
and hemlocks bordering the Dartmouth College hig
way between Hanover and Lebanon has been given
the town of Hanover by Prof. and Mrs. Charles
Haskins, of Hanover.

A movement for planting trees along highways a
in school yards has been promoted this spring by t
Society for Protection of New Hampshire Forests as
feature of the observance of the George Washingt
Bicentennial. For this purpose the society's committ
on tree planting, headed by Karl W. Woodward, offer
to distribute 200,000 5-year-old northern white pin
provided by the State forestry department. The tre
were to be loaded into trucks at the State forest nurser
near Concord, and delivered without charge at loc
tions specified by those who had undertaken to pla
them.

◆

Private tree planters in Berks County, Pa., receiv
500,000 forest trees from the State nursery supply th
spring. In addition the Reading Water Bureau pu
chased about 600,000 trees from other sources for plan
ing on the Maiden Creek watershed. Trees plante
in the county prior to 1931 as shown by State recor
totaled 5,000,000.

all Preferred as Season for Transplanting Conifers at Pennsylvania Nursery

For several years the practice followed in transplantg tree seedlings at the Rockview Nursery, operated connection with the New Western Penitentiary of nnsylvania, has been to do most of this work in the l. About 500,000 seedlings are transplanted each ar at this nursery, of which Harry G. Eby has charge forester of the State department of welfare. A l fall transplant is found to be better developed an a spring transplant both in roots and in top, and the fall more time is available for the work.

In order to hasten dormancy, the seedling beds are t irrigated after August 15. Transplanting begins out September 1 and usually continues through the nth. The transplant beds are watered on the ening before the planting, and the reset seedlings are tered each evening. In two or three weeks' time transplanted trees have made new growth, reestabhed themselves, and made ready to get a quick start the spring.

It was in August, 1929, that Mr. Eby began an periment to find what forest tree species in addition Norway spruce, white spruce, blue spruce, hemlock, d cedars could be transplanted successfully in the tumn at the Rockview Nursery. He used 16 species, anting 500 trees of each species in a solid block. Of rthern white pine and Scotch pine a block each of year and 3-year seedlings was planted. All the edlings were dug and planted under similar condins, in warm, dry weather. The operation was comted the same day it was begun. The trees were tered frequently, and all were mulched for winter. August, 1930, just one year after the planting, a unt of the living trees revealed the following results:

Species	Age	Establishment percentage	Species	Age	Establishment percentage
rway spruce	2	96.5	Hemlock	3	72.6
dar	2	95.8	Western yellow pine	2	64.3
rthern white pine	2	94.0	Austrian pine	2	55.4
panese red pine	3	91.4	Pitch pine	3	42.5
uglas fir	3	85.1	Corsican pine	2	40.9
ite spruce	2	84.3	Jack pine	2	40.8
ortleaf pine	2	78.5	Scotch pine	3	35.5
otch pine	2	73.3	Norway pine	2	32.8
rthern white pine	3	72.9	Mountain pine	2	16.9

In this experiment the hard pines as a class suffered e most severely.

If possible, fall planting should, of course, be done at time when the soil is moist, Mr. Eby remarks, and it ould not be delayed until the soil becomes too cold permit some root growth before winter sets in. The ly extra expense involved in fall transplanting, he ds, is that of mulching. It is necessary to mulch ther heavily to prevent the young trees from being heaved out in the spring. At the Rockview Nursery pine needles, straw, and hardwood leaves have been tested as mulch. The pine needles have been found the most desirable material, because they will not blow from the beds and may be used as a permanent mulch through the summer.

Los Angeles County Forest Planting Assumes Experimental Character

Los Angeles County, Calif., continued its forestation program in 1930 with the field planting of 56,861 trees. Planting was done on 10 different areas and with approximately 20 different species. Potted trees made up 60 per cent of the stock used. In reporting this diminished annual planting the county forester, Spence D. Turner, announced a change of policy which substitutes experimental planting for large-scale forestation work. Extensive planting is being continued in a few instances in which special conditions are present.

In addition to planting trees in the numbers quoted the county forestry department distributed 9,962 trees from its nurseries to individuals for planting on major watersheds.

Roadside trees planted by the department in 1930 numbered 13,761.

An inventory of the department's nurseries revealed a total stock of 137,586 seedlings and 95,562 transplants, including 67,624 transplants in pots. During the year the department collected 4,300 pounds of clean seed of various forest tree species.

Two new forest fire fighting trucks equipped with 600-gallon water tanks and 120-gallon-per-minute pumps were purchased during the year by the county, which now owns four trucks of this class.

❧

Plans of the Vermont Forest Service for the spring of 1931 called for the planting of 100,000 Norway spruce on the Calvin Coolidge State Forest, Plymouth, and for smaller plantings on several other State forests.

❧

The establishment of a municipal forest by the city of Rome, Ga., was provided for by the late Frances Andrews, botanist, who bequeathed for this purpose royalties from books published by her.

❧

To get first-hand evidence against the razorback hog as a destroyer of longleaf pines P. N. Howell, one of Mississippi's State forest commissioners, followed a hog for 8¼ hours, from 8 a. m. till 4.15 p. m. In that time the hog rooted out 400 trees. At that rate, Mr. Howell calculated, in 100 days the hog would destroy trees the growing and planting of which would cost $200, or more than forty times its own value.

Tennessee Law Puts Penalties on Carelessness with Fire

Under an act of the Tennessee Legislature approved March 20, 1931, it is unlawful for anyone originating or using an open-air fire to leave the fire unextinguished if it is within 150 feet of forest or woodland or of inflammable material from which fire would be likely to spread to forest or woodland. The penalty established is a fine of from $5 to $50, together with costs. In addition, a violator of the law is made liable for damages, including all costs incurred in efforts to extinguish the fire.

Hawaiian Planting Project Succeeds on Eroded Land Prepared with Dynamite

At Fort Shafter, Hawaii, swamp oak and silk oak are showing unexpectedly good survival and growth on eroded land which enlisted men prepared for the planting by means of dynamite. The scar on which the planting was done is the largest on the Kahauiki ridge, having an area of more than 28 acres. In blasting holes for the tree planting one-third to one-half stick of dynamite was used for each hole. Ten men were able to make from 250 to 300 holes a day. The dynamiting was begun on November 12, 1929. The planting, which was carried out by the territorial forestry division, was begun in December, 1929, and continued through April, 1930. In that time 17,533 trees were planted on a little more than 21 acres. On January 9, 1931, Territorial Forester C. S. Judd and an assistant made a count of 524 of the trees on the most exposed section of the scar. Of this number only 51 were blanks. Of the survivors 96 were 1 foot high, 243 were 2 feet high, 117 were 3 feet high, and 17 were 4 feet high. Thus the survival percentage was 90.3 and the average height of the surviving trees was 2.1 feet. Describing results as of January, 1931, Mr. Judd writes:

> The soil around the trees in the holes that were dynamited is still well pulverized and soft, after one year since treatment.
>
> The area received gentle showers during the summer of 1930, which favored tree growth, and there were four very heavy downpours, the last coming on November 18, 1930, when Kalihi Valley was flooded, with loss of life. These downpours have washed out a few of the young trees, but more damage has been done by the strong trade winds, which pick up dirt particles and thus have an abrasive effect on the plants. One slide near the top of the largest scar, resulting from an overhanging bank giving way, also wiped out a small section of the trees.
>
> In spite of these destructive agencies and notwithstanding the fact that the trees were planted in hard soil practically devoid of organic matter, remarkable success has been attained, and I feel safe in predicting that within four years the ugly scar will be so well covered by these trees that it will show up green instead of red as at present.
>
> The trees have put out a remarkable root system and show a wonderful tenacity in maintaining themselves in this sterile soil. One swamp oak 2½ feet high and one year old, in the effort to obtain moisture in loose soil near by, has put out a rootlet 7 feet long.
>
> These results compare very favorably with those obtained on other areas furnishing much better soil.
>
> On the above date of inspection, it was with pleasure that I saw three soldiers from Fort Shafter cultivating the trees that were in need of attention.
>
> Because of the success so unexpectedly attained in this planting it is thought to be well worth while to complete the project.

Florida Commercial Forestry Conference

The first Florida Commercial Forestry Conference, held at Marianna April 17 and 18, had a registered attendance of 140. The program arranged under the auspices of the Florida Chamber of Commerce and the Florida Forestry Association, with assistance from the United States Chamber of Commerce, opened with a half-day session on the topic "Florida's forest wealth," with local conservation officials, a local turpentine operator, and the president of the State federation of women's clubs as speakers.

Florida's forest industries were the subject of the afternoon session. Carl Speh, of the Pine Institute of America, told of improved practices in the turpentine and rosin industry, advocating protection by firebreaks as less expensive and more profitable than raking and burning. S. O. Shinholser, vice president of the Standard Container Manufacturers, told how improved container manufacture had established markets for fruits and vegetables. Harry Lee Baker, Florida State forester, discussed the plans of the State forest service, which at present are devoted mainly to public relations, applied forestry and research, and fire control. One purpose entertained by the service is to have a highway demonstration forest plantation in every county. One-tenth of the total forest area of the State, or 1,400,000 acres, is now protected from fire, he said. The forest protection system includes 17 steel fire towers. Samples of paper produced from southern woods in experiments carried out by the Forest Products Laboratory were shown and discussed by Senior Chemist P. K. Baird. Mr. Baird expressed the opinion that the 1,200 tons of wood pulp per day now imported into the United States might as well be furnished by the South. This opinion was affirmed also by Charles Herty, industrial chemist, of New York City.

Forest land problems were discussed in the morning session of April 18. C. H. Overman, of the Bagdad Land & Lumber Co., speaking on "Effects of taxation on holding forest property," asserted that no less than 20 per cent, or 5,000,000 acres, of Florida's forest land has been cut over and burned and is now listed as tax delinquent. E. A. Ziegler, senior forest economist, United States Forest Service, said that only 10 per cent of the soil food available for second-growth pine in Florida is being used at the present time.

The conference concluded with a visit to the Southern ft Paper Plant at Panama City. This plant is w producing 200 tons of kraft paper a day and has a acity of 400 tons. Of special interest are the de- s for salvaging chemicals and heat. The company ing the plant owns 70,000 acres of land on which plans to produce pulpwood.

onnecticut and Massachusetts Provide Forestry Work for Unemployed

Acting on a recommendation which Governor Wilbur Cross embodied in his inaugural address, the Con- ticut Legislature appropriated $100,000 to provide rk on State forests as a measure for unemployment ef. Within a few days after the act was approved, February 4, work was provided for crews of men on te forests in several different sections of Connecticut. March 14, 400 men were working in 15 State forests, d 100 men in 10 State parks. These men came from Connecticut cities and towns. Governor Cross esti- ted on March 14 that at least 3,000 people were eiving substantial relief through this appropriation. Massachusetts likewise made work on State forests a ans of unemployment relief, devoting $100,000 to purpose. This money, however, instead of being cially appropriated came out of regular appropria- ns for the purchase and development of State forests.

* * *

Land classified under the Indiana forest taxation v in the 5-month period ending with February of is year totaled 12,917.7 acres. This land is the operty of 143 different owners.

Newnan, Ga., Establishes Municipal Forest

Newnan, Ga., is initiating forest management on its 800-acre watershed property. The Georgia Forest Service has made a survey of the property and prepared a plan of management. A 5-year planting operation is planned to reforest 250 acres of open land. The existing stand will be improved by the removal of dead and damaged trees and of inferior species. A portion of the land bordering the La Grange highway has been set aside as a park area.

* * *

Conservation Week was observed in New York State April 1–7, in response to a proclamation by Governor Roosevelt. During the week the Empire State Forest Products Association mailed reprints of a Journal of Forestry article by its secretary, A. B. Recknagel, entitled "What the private timberland owners are doing and have done in forestry in the Adirondacks," to 1,412 New York State lumbermen, foresters, fish and game clubs, daily and weekly papers, etc. Inclosed with each copy of the reprint were two 6-inch rulers of Adirondack hard maple bearing a fire warning.

* * *

A 10-acre experimental planting of Norway spruce for Christmas-tree production was a part of New York's plans for forestry work this spring. The planting site chosen was a part of a reforestation area recently acquired by the State in Livingston County, north of Canaseraga. The trees were to be planted 3 feet apart each way.

Education and Extension

ew York State College of Forestry Admitted to International Research Union

The New York State College of Forestry, Syracuse, . Y., has been elected to membership in the Inter- ational Union of Forest Research Organizations. his is the sixth institution in the United States to ecome a member of the union, those previously dmitted to membership being the Harvard Forest, e Yale School of Forestry, the School of Forestry nd Conservation of the University of Michigan, the orest Soil Laboratory of Cornell University, and the orest School of the University of California.

The International Union of Forest Research Organi- ations originated in 1929 when the International nion of Forest Experiment Stations adopted a new onstitution extending its field to include all forest research. At the end of 1930 it had 54 ordinary and 3 associate members, in more than twenty nations. The largest membership in any nation was that of Germany, including eight institutions. The British Empire had six members.

Cornell Works Out Effective Method of Exterminating Weed Trees

Sodium arsenite proved practicable as a means of killing the crowns and root systems of aspen and pin cherry, in experiments carried out in the autumn of 1928 and that of 1929 by the Cornell Agricultural Experiment Station. A high concentration of the chemical was required, but only small quantities were needed. Similar success resulted from experiments with sodium arsenite as a means of eliminating hawthorn from pastures. On a representative area where hawthorn stems, averaging 7 feet in height, numbered nearly 1,500 per acre, 90 per cent of these trees were killed by a single treatment which required 1½ gallons of poison and five hours of labor per acre.

Members of the college staff have designed a new tool which will materially reduce the labor cost of tree poisoning. With this tool a single operation suffices to make the incision in the base of the tree and introduce the chemical into it.

Cornell Pine Plantation to Succeed Despite Extensive Weeviling

Weevil damage to three trees out of four need not prevent planted northern white pines from forming a final stand of high quality, according to findings presented by A. R. Mann in his 1930 report as director of the Cornell University Agricultural Experiment Station. Conclusions from a special study of weevil damage on sample plots in the Hyphen Plantation, at Ithaca, are stated by Dean Mann as follows:

> Although 76 per cent of the white pines were weeviled at some time during the first 12 years in the life of the plantation, there remain a sufficient number of unweeviled trees, and trees in which the weeviling would not affect a 12-foot butt log, to form a final stand of high quality at maturity. It is expected that badly weeviled trees will be removed in successive thinnings when the plantation is between 35 and 55 years old. The department estimates that the net loss resulting from weevil injury, in board-foot volume or in income produced, will not exceed 10 per cent of the value of an unweeviled stand. No significant differences in amount of weevil damage could be found between white pine growing in alternate rows with Norway spruce and white pine growing in alternate rows with red pine.

❧

New York county supervisors of reforestation work and others were invited to Cornell University in April of this year, as in the spring of 1930, for a 2-day tree-planting school. The instruction offered by different members of the forestry faculty had to do with sites, species, spacings, methods, fire protection, and maps and records.

❧

Work is under way on the new science building of the New York State College of Forestry, to be called the Louis Marshall Memorial. The appropriation provided by the State for this purpose is expected to cover also the construction of a greenhouse.

❧

Thirteen students are being graduated from the Georgia Forest School this year. The freshman class registered in the fall of 1930 numbered 33. Gordon D. Marckworth, now head of the school, is assisted by B. F. Grant and Jack Thurmond as resident instructors.

Gift Enlarges Demonstration Forest of North Carolina State College

George Watts Hill, of Durham, N. C., has added 72 acres to the 378-acre demonstration forest, located on the Roxboro highway 17 miles north of Durham, which he presented last spring to the North Carolina State College of Agriculture and Engineering. The addition consists of three separate tracts adjacent to the land given in 1930. Both the original gift area and the addition are partially timbered. The first contains some 3,000,000 feet of merchantable timber; the second has a stand of more than 4,000 cords of pine wood large enough for pulp and lumber and more than 300,000 feet of hardwoods of saw-timber size. The lands are especially well fitted for the forestry work planned by the college, says J. V. Hofmann, head of the college's department of forestry, and contains enough timber to permit a beginning in actual forest management.

The timber on the newly acquired tracts is of Virginia pine, shortleaf pine, and various species of oak, beech, birch, and maple. A considerable quantity of cedar is scattered through the stand, and some areas are expected to produce dogwood of good quality. The open areas would restock naturally with the species present on areas surrounding them, says Doctor Hofmann, but it is more desirable to introduce loblolly pine on the moist sites and to increase the percentage of shortleaf pine elsewhere. This will be done by planting seedling stock.

The forest tree seedlings to be used will be grown in the college nursery by the forestry students. They will be planted in the field partly by the students and partly on a commercial basis.

Development of the tract through its own revenue will become possible as soon as cutting operations are begun.

Six hundred acres of woodland on Mr. Hill's Quail Roost Farm is to be managed by the State college forestry department on the same basis as the demonstration forest.

Nearly Four-Fifths of Idaho Forestry Graduates Remain in Profession

Of the 103 living forestry graduates of the University of Idaho 81, or 79 per cent, were engaged in forestry work at the time of a count made by Dean F. G. Miller in September, 1930. Of the 74 men who received the bachelor's degree only, 70 per cent were still in forestry work; of the 29 who had also taken the master's degree, either at the University of Idaho or elsewhere, all had remained in forestry work. Men employed by the Federal Government made up 65 per cent of the 81 graduates still in forestry. Other groups within this number were men employed by private lumber companies, 20 per cent; members of faculties of forest hools, 6 per cent; men in the service of foreign untries, 5 per cent; extension foresters and graduate udents, 2 per cent each.

The earliest of these graduates received their plomas in 1909.

ire-Control Demonstrations in Rural California

For the fourth year, a series of rural fire-protection emonstrations was carried out this spring in California y Extension Engineer J. P. Fairbank and Extension orester Woodbridge Metcalf. Between March 10 nd April 27 more than 12,000 people were reached in e northern and central counties. It was planned to ntinue the campaign through the following three eeks.

Each demonstration occupied about 1½ hours' time. s a prelude to demonstrating several kinds of fire quipment the extension men discussed common fire azards around the farm and in range and forest untry, the effects of fires on the permanence of the rest and of agricultural industries, and effective ethods of reducing fire hazard.

Accompanying the two extension demonstrators was tate Forest Inspector E. B. Biggs, with one of the ewest tank fire trucks of the California Division of orestry. The State now has 16 such trucks in operaon and has 7 more under construction. This truck built up on a 1½-ton Ford chassis. A Warford ansmission carried behind the regular 4-speed transission gives a range of 12 speeds ahead and 3 everse, making the truck very effective in rough untry, on soft ground, and on mountain roads. The uck carries 150 gallons of water and is equipped with Viking pump driven by the truck engine, the pumpg capacity of which is 30 gallons per minute. It has x knapsack pump tank outfits and a number of hand re-fighting tools.

* * *

Thirty-four students of the New York State Ranger hool received their diplomas on March 11 of this ear. The 1932 class of the school includes 52 stuents from 12 different States.

* * *

Sixty Eagle Scouts have undertaken to reconstruct e trail along the shores of Bowman Lake, on the west de of Glacier National Park, this summer. Last year 4 Eagle Scouts from 18 States completed 4,050 feet trail in the Gunsight Pass region of Glacier Park.

* * *

Ohio 4-H forestry clubs collected more than 500 bushs of walnuts last fall for planting in State forest urseries. The State department of forestry paid for e nuts at the rate of 50 cents a bushel.

Wisconsin Planting Demonstrations

Twenty-four Wisconsin county agents arranged 96 forest and windbreak planting demonstrations this spring, in which use was made of more than 100,000 trees provided by the State Conservation Commission. In addition planting and improvement work was conducted on 17 school forests in the northern counties by school students and members of the junior forest ranger clubs. Oneida County established four school forests and carried out several farm forest planting demonstrations without needing to avail itself of the conservation commission's offer of trees, turning instead to junior forest ranger home nurseries. Oneida is the first county in Wisconsin to have had sufficient planting stock raised by junior club members for a year's planting demonstrations.

Arkansas Fires of 1930

Of the 3,924,184 acres of forest land in Arkansas for which some kind of fire protection was provided in 1930, fires occurring in that year covered 202,829 acres, reports Extension Forester Charles A. Gillett. Fires occurring on protected land numbered 2,185. Of the 18,021,553 acres of forest land in the State for which no protection was provided, 21,094 fires covered 4,741,000 acres. Thus the proportion burned over was 26.3 per cent for unprotected land and more than 5.1 per cent for protected land.

* * *

Twenty-four senior forestry students of the Pennsylvania State College arrived in March at the permanent summer forestry camp of the Louisiana State University, about 6 miles from Bogalusa, La., for several weeks' practical forestry work under the direction of Professors Demerritt and Lutz. They visited and studied forestry operations of the Urania Lumber Co., and were expected to visit the Ouachita National Forest, Ark.

* * *

Ninety acres of wooded land is to be added to the Camp Pioneer reservation of the Hartford, Conn., Boy Scouts through the generosity of Louis R. Cheney, former mayor of Hartford. Mr. Cheney has given $2,000 for the purchase of this addition, with which the camp-ground area will total 150 acres.

* * *

A 3-week vocational forestry camp for boys is to be held this summer at Young Harris College, in the mountains of north Georgia, by the State agricultural vocational department and the State forest service. One student from each of the counties having vocational schools will be selected on the basis of a competitive examination to attend the camp free of charge. Other boys will be admitted.

Forest Service Notes

Forest-Surveying in the Bottomlands

By C. M. Granger, United States Forest Service

The director of the forest survey in the bottomland hardwoods of the Mississippi Delta Region, G. H. Lentz, and his associates are fast becoming amphibian. In order to run lines across this 30,000,000 acres of "flatwoods" and take sample plots wherever they fall automatically, one has to be equally at home on land and in water. One has also to be in such a mental state that he can take seriously a "ridge" not more than 2 feet higher than the surrounding terrain and having the same topographical aspect as a tennis court, because these Lilliputian eminences cause highly important changes in forest types and growth. One must have an especially alert eye to detect the transition from one to another of the 12 forest types and to identify accurately each of the fifty-odd commercial species. And above all one must have a good disposition and a sense of humor to cope with rain, mud, swimming and wading, heat, mosquitoes, chiggers, snakes, palmetto, briars, poor drinking water if any, hominy grits, and the ubiquitous savage coffee over which visiting northerners particularly grouse.

To one whose first experience in helping organize the forest survey was in the Douglas fir region of the north Pacific coast, the Mississippi Delta hardwood bottomlands present a most abrupt contrast in conditions. The country is unbelievably flat. There are water courses big and little, and swamps in profusion. There are belts of agricultural land adjacent to most of the roads, with timber bodies of all sizes in the back country. Very little virgin timber remains. The bulk of the existing forests consists of culled or cut-over stands and second growth on old fields.

Because so little of the virgin timber remains, reliable cruises are in existence for only a minor fraction of the territory. In general, therefore, the inventory of forest resources has to start from scratch. A method similar to that used in the forest surveys of Sweden and Finland seems likely to be the most fruitful, so a linear system of survey has been adopted and is now being tried out in two adjoining compact parishes (counties) in northern Louisiana.

In this first test lines are being run 3 miles apart, east and west, with sample plots every 10 chains. For the merchantable timber the sample plots are one-quarter acre, for the timber below merchantable size one-twentieth acre, and for small reproduction one-one-hundredth acre. Along the line, which is run with a compass and chained, a linear record is kept of the physical forest sites (ridge, flat, swamp, etc.) and the condition of the forest (virgin, culled, cut over, etc.). On the sample plots records are made of the type, species, volume, log grades, growth, soil, drainage, etc. Special plots are taken for damage data. Records are kept also for the agricultural areas to show the general quality of the land and the portions reverting to forest, as an indicator of the probable addition to the forest lands from farm-land abandonment.

Out of this preliminary test, after statistical analysis of the results, will come a final determination as to what interval between lines and sample plots will make it possible to obtain acceptably accurate figures on area, volume, and other major factors in the forest survey.

With only twenty-three thousand and odd dollars of Federal funds available per year for this work so far it will be slow going to cover the whole 30,000,000 acres. It is hoped to raise additional funds through cooperation with the States and with other agencies directly interested.

Tractor Logging in the California Pine Region

By B. O. Hughes, United States Forest Service

The success with which tractors replaced horses in agricultural work suggested the use of tractors in California pine logging. Tractor logging was introduced in the comparatively flat country of northeastern California in 1922, and rapidly supplanted both horse-drawn and steam equipment there. In the past three or four years tractors have invaded the west slope of the Sierra, and they are now being used wherever the topography will permit. Two-thirds of the cut in the pine region is now handled with tractors.

The change from horses to tractors eliminated the need for the large crews of workmen that had been required to clear roads for horse-drawn wheels. It also eliminated the heavy expense of caring for horses through months of idleness. Tractors hauled larger loads and hauled them faster than horses could. Tractors had an advantage over steam equipment, too, in lower labor costs, greater flexibility, and, last but not least, much lower fire risk.

Operators who pioneered in tractor logging had their share of disappointments. Big wheels built to be drawn by horses had not the strength for tractor logging. Tractors built for agricultural use were not sturdy enough for use in the woods, and under severe conditions and unskillful handling were constantly breaking down. But manufacturers taught loggers how to care for their machines; and loggers taught manufacturers something about design, with the result that improvement took place every year both in tractors and in tractor equipment.

Several studies have been made to determine just hat destruction occurs in this type of logging, how it ccurs, and how it can be reduced. In a stand averag- g 27,000 board feet per acre, of which 19,000 feet was arked for cutting, it was found that 62 per cent of the oung growth under 4 inches in diameter, 82 per cent the poles between 4 inches and 12 inches in diameter, d 95 per cent of the reserved trees more than 12 ches in diameter survived logging. This compares ry closely with the results of horse-drawn big wheel gging. In both cases all loss in diameters of more an 12 inches and a large part of the loss between 4 d 12 inches was due to timber felling. A study made a modified high-lead setting on the west slope of the erra furnishes a picture of the results obtained in gulated donkey logging. In a stand averaging 76,000 oard feet per acre, of which 65,000 feet was marked r cutting, it was found that logging was survived by 5 per cent of the young growth under 4 inches in iameter, 57 per cent of the poles between 4 inches d 12 inches in diameter, and 76 per cent of the served trees more than 12 inches in diameter. This omparison is not entirely conclusive, since the stand nd topography were different in the two cases. owever, there is no doubt that tractor logging results much less damage to trees of the higher diameters han does donkey logging. Injury and even total estruction run high in the diameters above 12 inches hen donkeys are operated. Tractors never destroy rees of that size and comparatively seldom injure them.

The latest innovation in tractor logging equipment is nown as the "fair-lead wheel." A tractor is equipped ith a single drum winch, the cable from which runs ver a roller (called a fair lead) supported by a high- rched axle mounted on crawler-type wheels. In peration the wheels are backed as close as convenient o the logs as they lie in the felled tree. A wire choker s placed about each log and hooked to the end of the able until enough logs have been attached to make p a full load. By means of the winch the tractor river reels the logs into position under the arch with heir front ends suspended. The winch brake is set nd the load is ready to move. A study made by the nited States Forest Service indicates that logging by his method, if properly supervised, results in less amage than other kinds of tractor logging.

It should be borne in mind that the studies here eferred to were made on national-forest sale areas nder some degree of regulation. The results repre- ent what can be expected of tractor logging when it s the operator's intention to save as much as possible f the advance growth. In other words, they point o possibilities rather than give a picture of what is ctually happening on tractor-logging operations. The value of the future forest resources of California epends not so much on what the Government does s on how private owners handle their timberlands. By using the tractor, operators can leave their cut-over and in condition to produce successive crops of timber.

Forest Service Pledged to Conserve Scenic Beauty of Forest Roads

By L. F. Kneipp, United States Forest Service

Within the last decade, or more exactly the last five years, public demand for recognition of the æsthetic and recreational values of roads has developed a new point of view on the part of road-building agencies. Since the traveling public contributes in large degree to the costs of national-forest road construction and maintenance, its desires with respect to the æsthetic aspects of road location and of the management of lands abutting upon and visible from roads deserve attentive consideration.

Location of roads on national forests, as elsewhere, has hitherto been conceived as exclusively an engineering function. Speed and economy of transportation, and economy of construction and maintenance, have been dominant considerations. The obvious desirability of avoiding or holding to the irreducible minimum unsightly cuts and fills has not governed location to such an extent as it should. Until quite recently, the recreational and inspirational aspects of road service have been subordinated. There have been few studies of available scenic resources with the intent to realize their potentialities most fully by proper correlation of road construction, no established practice of consulting experts in landscape planning or recreational development. It is evident that a new order is necessary; the fact that much use of each road will be recreational in character must be recognized, and the development of scenic, inspirational, and recreational assets must be a major factor in the planning of road systems and of particular roads.

Impairment of æsthetic qualities of abutting lands has usually been coincident with the initiation of road construction. The gravel and borrow pits, rock quarries, rock crushers, stock piles, oiling stations, camps, etc., have customarily been located within the right of way or on land immediately contiguous to it. All too often construction work has been terminated with little effort to remove or cover over these eyesores. Bridge and other structural timbers have been cut from trees which, in place, would have been scenic gems. Clearings of timber have frequently been much wider than was necessary, leaving ugly expanses of stumps in place of the intimate touch of the forest. Logs, stumps, and brush resulting from the clearings have not always been disposed of, and where disposal has been attempted the fires have sometimes destroyed contiguous forest cover. Permanent road-maintenance stations, with attendant stables, garages, etc., frequently have been constructed in close proximity to the roadside when they might just as readily have been located out of sight behind a fringe of trees.

Following road construction the next detrimental factor has been the erection of numerous signs which in form, design, and colors were wholly incompatible with their environment. Primarily these were of an advertising character, but in many instances they described the road and the agencies by which it was constructed. Another inharmonious development has been the construction, in close proximity to the right of way, of business or residential structures the design, color, or use of which markedly impaired natural beauty, or the dedication of abutting lands to forms of use incompatible with realization of the full scenic and inspirational qualities of the road. Still another inharmonious use has been that of unregulated, sometimes unauthorized, timber cutting upon lands contiguous to the roads and visible from them, often resulting in total elimination of scenic beauty and natural interest.

The Forest Service can justly claim that it was one of the first public agencies to realize that these practices were an offense against the public interest and take steps to prevent their further occurrence. To preserve the beauty of a road leading into the Yellowstone National Park, the Forest Service, nearly a quarter century ago, modified its practice of marking the trees to be cut on one of the first large sales ever made under its direction. A full decade or longer ago the service began to stress the need for so locating roads as to realize most fully their value for the development and enjoyment of scenic and recreational resources. For more than a decade the preservation of timber fringes along main traveled roads has been a cardinal principle of national-forest timber management. More than a decade ago the service began to control advertising signs upon national forest lands and initiated a system of official signs that would not impair natural beauties. Almost as long ago it began to emphasize the need for care in road construction so that the beauty of abutting lands might not be destroyed, and to require that the unavoidable disturbance of natural conditions by borrow pits, quarries, camps, etc., should so far as practicable be remedied before the construction job was regarded as complete. Almost as long ago it began to restrict more closely the authorized use for private purposes of lands closely adjacent to the roadsides.

Not all the objectionable roadside conditions observed within national forests are chargeable to Forest Service administration. There is almost 24,000,000 acres of privately owned or State land within the national forests, much of it traversed by roads. Such land is not under the jurisdiction of the Forest Service and may be used or occupied as the owners or tenants see fit.

Then, too, the ease and freedom with which the present mining laws of the United States permit individuals to establish rights of occupancy upon national-forest lands militate against proper control of roadside values. Many locations are made for business purposes, and until declared invalid are subject to uses seriously destructive of roadside values and beauties.

It would be a mistake to assume that the maximum inspirational value and interest can be derived only from stands of timber which are absolutely untouched. There are some roads where a single forest type such as lodgepole pine extends monotonously mile after mile, where variation in size or age classes induced by good silvicultural practice would enhance rather than diminish beauty and interest. There are other instances in which a high educational value and increased public interest would result from roadside examples of good forestry practice typifying principles of silviculture, utilization, and slash disposal. In still other cases the controlled removal of dead or decadent trees, or trees of inferior and unsightly species, would enhance not only the beauty but the safety and service of the road. The admittedly desirable preservation in unmodified condition of examples of virgin or veteran tree growth frequently will necessitate special technical measures against damage by disease, insects, fire, etc.

Each highway is a problem in itself, with features peculiar to it. The conservation of the beauty of adjoining lands can not be accomplished by dedicating to road use a certain arbitrarily chosen width of right of way. On the contrary, the desired result can be obtained only by a detailed and planwise study of land status, a classification of the abutting lands on the basis of their highest use, æsthetic as well as commercial, and the formulation of specific plans to govern all subsequent use and occupancy. The width of the abutting strips related to the public enjoyment of a road vary markedly. Where hillside locations command wide views, large areas should be regarded as appurtenant to the road; while in narrow canyons or in gulches which bench or terrace, relatively narrow strips suffice. On extensive slopes where roads swing or switch back several times with the several tangents in close proximity to each other, an arbitrarily established width of right of way would be confusing and ineffective, and the extent to which the entire slope is involved in the æsthetic problem is determined by the nature of the cover and degree of visibility.

As a means of conserving the scenic, inspirational, educational, and recreational qualities of national forest lands contiguous to highways and roads, the Forest Service has pledged itself to the following measures:

All national forest lands within 200 feet of the center line of a Class A [1] or Class B [1] highway, or within 100 feet of the center line of a Class C [1] highway or road, shall be administered with the major objective of conserving and augmenting the scenic, inspirational, educational, and recreational values of said lands and roads, and no form of occupancy or use of said lands or the products thereof shall be allowed except with the prior approval of the regional forester or the Forester, who, before granting such approval, shall require full assurance that the proposed occupancy or use is necessary, is appropriately safeguarded, and will not result in a sacrifice of public values or services g ater than the public values or services to be de- r ed from such occupancy or use.

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[1] Class A roads are Federal highways; Class B roads, State highways; class C roads, county and community roads.

While the proposal to acquire all timbered lands ntiguous to highways by granting national-forest mpage in exchange therefor is regarded by the rest Service as impracticable, the acquisition of as of privately owned forest land within the boun- ries of the national forests for the purpose of con- ving roadside beauty will be accomplished as idly as such lands can be acquired through exchange h due regard to other requirements of public in- est.

The detailed and systematic planning of the man- ement and use of all national-forest lands tributary class A, B, or C roads, including not only the 400 200 foot strips but such other lands as may affect public value of a given road, will be regarded as lefinite and current administrative function of the rest Service, to be carried to consummation as idly as the available personnel and funds and other ministrative obligations will permit. National park proach roads will be given initial consideration. oject plans will be personally considered by the gional forester and when approved by him will ereafter govern all occupancy and use of the lands volved.

Phenological Study in the Northern Region

A Forest Service study of plant-life phenomena as ated to seasonal weather conditions has been in ogress in Montana and northern Idaho for the past ree years. At 33 stations on national forests and at stations on national parks 24 forest officers and 2 her observers have been recording the time of leafing, llination, cone opening, leaf fall, and similar pheno- gical events. Twelve species of conifers, 19 species of rdwoods and shrubs, and 19 species of herbaceous ants, all prominent in the flora of the region, are ing followed. (In each of these groups a few plants ve not been observed over a range wide enough to arrant compilation of records for the region.) Data ve been taken on 16 events for each conifer and 9 for ch hardwood, shrub, or herbaceous plant.

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The office of forest products of the Portland, Oreg., gional office of the Forest Service has been combined ith the Pacific Northwest Forest Experiment Station, Portland. W. H. Gibbons, formerly in charge of the ffice, is now assigned to the Washington, D. C., head- uarters of the service as a specialist in economics, to andle matters having to do with the national drain on rest growth; his three assistants, A. H. Hodgson, H. I. Johnson, and H. R. Spelman, have joined the staff f the experiment station. This station is now con- ucting work in four fields: Silviculture, forest survey, conomics (insurance), and products.

Calcium Chloride as a Fire Retardant

In tests conducted by Paul Stickel, of the Northeastern Forest Experiment Station, a 4-foot firebreak covered with calcium chloride which had thoroughly deliquesced was effective in stopping a grass fire at most points. Where the fire did enter the treated firebreak little effort was required to bring it under control. The fire was set in the early afternoon and at the height of the fire season. The quantity of dry calcium chloride used in treating the firebreak was 2 pounds per square yard.

It was found that to serve effectively as a fire retardant the calcium chloride must have time to deliquesce. The time required for deliquescence varies with atmospheric conditions. Under conditions such as exist in the Northeast, one night is the minimum required. After heavy rains no trace of the compound was found on the surface.

A Movable Map Board for the Lookout

By L. H. Reineke, United States Forest Service

It sometimes happens that a fire lookout, sighting on a fire through his alidade to determine its direction, finds his view obstructed by the corner posts of the lookout cabin. It is desirable in such cases to move the map board a small distance to obtain a clear view, but it is essential to keep the map oriented perfectly. Devices now in use do not maintain perfect orientation.

A simple device that obviates this difficulty consists of four metal arms about 7 inches long, having a hole one-half inch from each end, and eight pivots. Four pivots are fastened to the table, at the corners of a rectangle somewhat smaller than the map board. The other four are attached to the bottom of the map board, spaced exactly as those on the table. Each of the metal arms is fitted to a pivot on the table and to the corresponding pivot on the map board. This system constitutes a set of four "parallel rulers" arranged to form a rectangle. The map board retains its original orientation regardless of the direction in which the four arms point and the total movement is twice the length of the arms, or 12 inches.

By using arms of other lengths any desired range of movement up to nearly twice the smaller dimension of the board can be obtained.

* * *

Four lookout towers are being constructed on the Sacramento Canyon district of the Shasta National Forest, Calif. With these towers added to the four already in use, 84 per cent of this 400,000-acre unit will be directly visible from one or more towers. Areas that will be directly visible to lookouts when the towers now under construction are completed include 90 per cent of those on which fires have occurred in the district since intensive protection was instituted.

A Dendrometer that Costs Next to Nothing

A screw hook, a screw, and a dial micrometer gage become the means of accurately measuring tree growth when used according to a scheme devised by L. H. Reineke, of the California Forest Experiment Station. The screw hook must be of the type having the end bent at right angles to the shank. This hook is screwed into the wood of the tree, a little to one side of the point at which growth is to be measured. A very small screw is inserted into the bark only, directly in line with the end of the bent-over part of the hook. The distance between the head of this screw and the end of the hook is measured with the micrometer gage. As the bark is pushed outward by the growth of the tree it carries the screw with it, while the screw hook retains its original position. The distance from screw to hook at the first measurement minus the distance between them at any later time represents the radial growth during the intervening period.

The growth readings, which are made to one-thousandth inch, are not affected by expansion and contraction of the stem due to the pull of transpiration as are those made with the MacDougall type of dendrometer.

Each set of screw hook and screw costs only about 2 cents and the micrometer gage, which can be used to measure growth at any number of points, costs but $16.50. A single dendrometer installation of the usual type costs $250.

Growth in Western Yellow Pine Type Following Thinning on the Prescott

By Quincy Randles, United States Forest Service

Five years after an experimental thinning operation in the western yellow pine type on the Prescott National Forest, Ariz., remeasurement of the trees on the thinned plot and on an unthinned plot has brought out evidence that, other things being equal, a forest tree's capacity for growth is proportional to its effective crown area and root area. The thinning plot and the control plot, of 4.2 acres and 0.8 acre, respectively, were established in 1925 and remeasured in 1930 by the Southwestern Forest and Range Experiment Station. In 1925 the thinned plot contained 283 trees per acre, mainly between 3 and 12 inches in diameter at breast height; the unthinned control contained 772 trees per acre, mainly between 2 and 11 inches in diameter at breast height. Stump counts in 1925 indicated an average age of 41 years, a few trees being as much as five years above or below the mean.

The average diameter growth of all trees for the 5-year period was 0.58 inch on the thinned plot and 0.26 inch on the unthinned plot. In both thinned and unthinned plots the greatest average accretion was in the higher diameter classes. In each diameter class the growth was consistently about 0.2 inch greater on the thinned plot than on the unthinned plot. Growth on the thinned plot was closely associated with condition and size of crown.

In regard to condition and size of crown in 1930 the trees were classified on the basis of the appearance of foliage and an ocular estimate as to spread and length of crown in relation to diameter at breast height. The method is admittedly crude, but it is the only one that can be used quickly in timber work.

Relative growth by crown classes in the 5-year period is shown in the following table.

Crown class		Number of trees	Average diameter growth (inch)	Trees growing more than 5 inches (per cent)	Increment shown by maximum percentage of trees (inch)
Condition of crown	Size of crown				
Good	Large	165	0.83	88.0	0.8
	Medium	619	.62	60.0	.6
	Small	94	.39	12.8	.4
Fair	Medium	83	.48	30.1	.5
	Small	86	.36	7.0	.3
Poor	Medium	21	.31	4.8	.2
	Small	46	.26	6.5	.3

Growth of Planted Redwood Slow at the Start

Redwood trees planted from 1923 to 1925 by lumber companies in the redwood region of California were found this year to range from a few inches to 7 feet in height. Their average height as estimated by H. L. Person, of the California Forest Experiment Station, was less than 3 feet. Sprouts of the same age would average between 15 and 20 feet in height. Many thrifty trees were found growing in practically complete shade. A very high percentage of the trees damaged by fire were sprouted. On some of the areas natural seedlings, both redwood and Douglas fir, give promise of being an important factor in restocking cut-over lands.

Campaign Against Bark Beetle in Intermountain Region

Eighty national forest officers of the Intermountain Region, with 300 temporary employees, started out in April of this year in a campaign against the bark beetle which was expected to last into June. The method of attack, used in the region last year in treating 74,000 infested trees, was to spray the trees with oil and burn them standing. It was planned to give this treatment to 60,000 lodgepole pine trees on the Wyoming, Teton, Targhee, Caribou, Minidoka, Cache, Ashley, and Wasatch National Forests. Approximately 1 gallon of oil is required for each tree. Exclusive of the salaries of the forest officers, the work was expected to cost about $80,000.

ourt Order Protects Rangers In Killing Branded Horses as of Unknown Ownership

A perpetual injunction issued April 9 by Federal udge Fred C. Jacobs, of the District Court of Arizona, strains the county attorney and sheriff of Navajo ounty, Ariz., from arresting or prosecuting forest ngers on the Sitgreaves National Forest for killing orses, whether unbranded or branded, in areas of e forest closed by the Secretary of Agriculture to e grazing of horses. Injunction proceedings grew ut of the arrest of Ranger D. E. Slosser for killing vo horses that were found grazing on an area so osed. Within the meaning of the Secretary's order, e court held, a "wild horse" may be either an ndomesticated animal or a domesticated animal ving in a wild state, and a horse in trespass is "of nknown ownership" if the officer executing the order oes not know the ownership and would be unable by e exercise of reasonable diligence to ascertain it.

ational Forest Lands Set Aside for Research Use and for Perpetuation of Primitive Conditions

Five areas of national-forest land have recently een designated by the Forester as experimental forests, permanently dedicated to research use. The rst is the Gale River tract on the White Mountain ational Forest, N. H., which is representative of the pruce-hardwood forests of New England and is coneniently located for study of the pulpwood forest roblems of that section. This area includes approximately 1,320 acres. It lies between two State highways, a few miles west of Mount Washington. The Northeastern Forest Experiment Station, at Amherst, Mass., has had investigations under way on the area ince July, 1927.

The Fort Valley Experimental Forest of 2,420 acres on the Coconino National Forest, 10 miles from Flagstaff, Ariz., is representative of the western yellow pine ype.

The Priest River Experimental Forest of 6,355 acres n northern Idaho, on the Kaniksu National Forest, epresents the western white pine type. For the past 20 years this area has been used by the Northern Rocky Mountain Forest Experiment Station, Missoula, Mont., as a field laboratory for studies of fire protection and silviculture. It is within easy reach of Spokane and other eastern Washington and northern Idaho towns.

The Bernice Experimental Forest of 2,880 acres on the Deerlodge National Forest, near Butte, Mont., is representative of the lodgepole pine type. This area, likewise, will serve as a field for investigative work by the Northern Rocky Mountain Forest Experiment Station.

The Bent Creek Experimental Forest of 1,110 acres on the Pisgah National Forest, 10 miles from Asheville, N. C., exemplifies the southern hardwood type. Considerable work has already been put in progress on this forest by the Appalachian Forest Experiment Station. Cull timber and second growth occupy a large part of its area. The chestnut has been killed out by blight. The forest is typical of much mountain country in the Appalachian region. Good markets exist in the neighborhood of the forest for all material likely to be produced on it.

Under the same Forest Service regulation of 1930 that provides for the establishment of experimental forests, in the past eight months 28 tracts of national-forest land having an aggregate area of 4,056,733 acres have been set aside as "primitive areas." These lands are located principally in the Rocky Mountains and in the Pacific Coast States. Only one of them is less than 13,444 acres in extent; the largest has an area of 1,087,744 acres. On these lands it is the purpose of the Forest Service to maintain primitive conditions of environment, transportation, habitation, and subsistence, with a view to conserving their value for purposes of public education and recreation.

Under the third classification provided for in the regulation referred to, three national-forest tracts have been set aside as "natural areas," to be retained in an unmodified condition for purposes of research and education. These are the Chiminea Canyon of about 160 acres and the Pole Bridge Canyon of about 320 acres, both on the Coronado National Forest, Ariz., and Heart's Content, an area of 120 acres on the Allegheny National Forest, Pa. The Chiminea Canyon area contains distinctive types of cacti and other desert vegetation; the Pole Bridge Canyon area contains specimens of certain forest trees that have a very restricted range, such as Apache pine, Arizona pine, and Chihuahua pine, and also of live oak, walnut, sycamore, madrone, and other tree species typical of southern Arizona; the Heart's Content area contains one of the very few remaining stands of old-growth northern white pine.

Growth of Douglas Fir on the Cascade

Second-growth Douglas fir timber on the Cascade National Forest, Oreg., that was measured at the age of 54 years and again at the age of 74 years showed a volume increase of 78 per cent within the 20-year interval, reports the Pacific Northwest Forest Experiment Station. Measurements were made on three 1-acre plots, the Scribner scale being used. In 1910, the year of the first measurement, the volume of the timber on the three plots averaged slightly more than 33,000 board feet per acre; in 1930 it averaged more than 59,000 board feet per acre. Between 1910 and 1930 the average height of the trees increased by from 25 to 30 feet and their average diameter increased by more than 4 inches.

Buildings for Research Use are Part of Program for Unemployment Relief

As part of the Forest Service program of unemployment relief the following buildings are being constructed for use by forest experiment stations: At the Bent Creek experimental forest of the Appalachian station, 3 laboratories, 1 greenhouse, 1 bunkhouse, 1 superintendent's house; at the Kane experimental forest of the Allegheny station, at Kane, Pa., 1 laboratory, 1 superintendent's house; for use by the Lake States station, at the Cass Lake nursery, on the Chippewa National Forest, Minn., 1 field laboratory, and on the University of Minnesota campus, 1 greenhouse. In addition, several smaller structures for the use of experiment stations are being erected at various points in the Southwest where field observations are under way and at the Devil's Canyon nursery in southern California.

* * *

An area of nearly 1,000 acres of round second-growth pine timber within the boundaries of the Osceola National Forest, Fla., has recently been purchased by the Government with the purpose of providing an experimental tract for the use of the Southern Forest Experiment Station. The projected experimental forest is to include 3,000 acres of contiguous land not yet purchased by the Government. Work to be conducted on it by the experiment station will include both naval-stores and silvicultural practices. On this tract, also, will be centered the investigative work which the Forest Products Laboratory has under way on the Osceola Forest.

* * *

The conditional award made to the International Paper Co. covering the purchase of pulpwood and other timber from two large tracts on the Rio Grande and San Juan National Forests, Colo., has lapsed, the company having failed to meet certain stipulations and sign the formal timber-sale agreement by April 1, 1931. The timber is now open to purchase, at private sale, at the highest price bid by anyone who can meet the conditions of sale.

* * *

Norway pines planted along certain county highways in Iron County, Mich., have browned and died following treatment of the roads with calcium chloride during last summer's drought. When dying needles from such trees were examined by the Lake States Forest Experiment Station no large quantities of the salt were found on them, but the needles bore every indication of having been desiccated by particles of this material mixed with dust.

* * *

A study of Virginia pine has been initiated in north Georgia by the Appalachian Forest Experiment Station. Preliminary investigation has shown that well-stocked stands from 25 to 45 years of age are capable of producing a yearly average of from 1 to 1½ cords of pulpwood per acre. As much as 75 cords per acre has been cut on timber-sale areas on the Cherokee National Forest.

General Forest News

Early Turpentining with Cup and Gutter

By W. R. Mattoon, United States Forest Service

As early as the sixties J. C. Schuyler experimented with the cup-and-gutter method of turpentining on land near Georgetown, S. C. One of his cups is now in the possession of Charles H. Herty, of the Chemical Foundation (Inc.), New York City. Mr. Schuyler obtained a patent on his cup in 1867.

In 1894–95 W. W. Ashe, then in charge of forest investigations for the North Carolina Geological Survey, made use of zinc cups and gutters in turpentining longleaf pines near Bladenboro, Bladen County, N. C. He cut a groove on each side of the face with a handsaw, inserted zinc strips or gutters, and hung a cup just beneath the lower gutter. More than 100 such cups were hung and used for two seasons. Mr. Ashe's full account of this experiment is found on pages 100–104 of North Carolina Geological Survey Bulletin No. 5, published in 1904. Mr. Ashe obtained a gain of 15 per cent in the quantity of gum, or 35.8 barrels of gum more than the then prevailing average of 250 barrels per crop, and also a better grade of gum. The increase in value of yield amounted to 20 per cent.

For some years prior to these experiments in America the French system of turpentining, practiced on maritime pine in France, had consisted in using small cups and gutters on very narrow faces. American turpentining practice at that time was restricted to large-sized trees with very wide faces, so that in the early cupping tests in this country the French cupping method was greatly modified.

Samples of gum obtained by cupping which Mr. Ashe sent to the department of chemistry of the University of North Carolina attracted the interest of Charles H. Herty, then head of the department. The story is well known of Doctor Herty's epoch-making demonstrations, conducted over a period of years, of the advantages of the cup-and-gutter method over the very wasteful and destructive boxing system. It was in April, 1901, at Ocilla, Ga., that Doctor Herty hung his first cup.

ld-Animal Damage to New England Forests

Deer in New England are doing considerable damage orests, particularly to young plantations, reports a mittee appointed in 1930 by the New England ion of the Society of American Foresters to study l-animal damage to forests in that region. Accord- to the findings of this committee, which was headed Neil W. Hosley, deer are now fairly plentiful practi- y throughout rural New England. Deer damage eported as important only in Rhode Island, central northern Connecticut, and a few sections of Massa- setts.

The deer damage the trees principally by browsing the buds, leaves, and tender shoots at heights below et and usually below 4 feet. On 75 per cent of the s reported as injured by deer in Connecticut, the nage took the form of nipping off the leaders. In e cases deer were reported to have barked small s in rubbing the velvet off their antlers.

Practically all the native forest-tree species, both ifers and hardwoods, and most of the exotics nmonly used in the region, are reported to have been upon by deer. The only conifer reported to the nmittee as immune was white spruce, and the fact t no instance was known of damage to this tree may due to the fact that comparatively small quantities it are planted. Of the hardwoods, white ash is ecially liked.

Damage by deer takes place principally when the und is covered with snow, and is greater in severe n in mild winters.

The nipping of an occasional leader from a spruce s little effect; but if northern white pine, for example, heavily browsed its growth may be almost arrested.

Deer damaging crops may be killed at any time in the New England States except Massachusetts, but none of the laws authorizing such killing are forest es mentioned as a crop. Each of the States except nnecticut and Rhode Island has an open season on er, with one deer as the legal limit.

The porcupine is believed by the committee to do re damage to forests in the Northeast than any other imal within its range, which includes all New Eng- d north of southern Massachusetts. Porcupine ury is most prevalent in sections where ledges and ks give cover, but where food is available the por- pine makes its home in old buildings, hollow es or logs, or drains beneath roads. Forest damage this animal is particularly severe over the Vermont untains and through all of rural New Hampshire, pecially in the northern part. Throughout its range e porcupine lives on the bark of trees through the fall d winter. Observations indicate that it will bark any ecies of tree. In some places it prefers hemlock; in hers, hardwoods. At Petersham, Mass., it seems to d European larch especially attractive.

In some cases porcupines cut off branches so severely as to ruin the trees. A tree from which a patch of bark is removed would often heal successfully if left alone; but the porcupine seems to enjoy greatly the callous tissue that develops at the edge of the wound, and is apt to return to the same tree year after year, finally girdling it. In extreme cases a stand covering several acres is ruined.

Porcupine control by poisoning, which has been practiced with success by the Bureau of Biological Survey, can not be introduced into New England because poisoning of any sort is illegal in all the New England States. Hunting during the winter is ineffective because the animals usually spend the daytime in their dens. Trapping is effective but is unduly expensive where the distribution is general and widespread. Massachusetts law prohibits the use of steel traps except within 50 yards of cultivated land. Maine alone has a bounty law now in effect; this is reported to be working well.

Rabbits are accused by the committee of sometimes damaging forests in New England, living on the bark and buds of small woody vegetation during the winter. They are seldom numerous enough, however, to cause serious damage. In southern Connecticut rabbits are reported to do more damage than any other animal. In one 3-acre plantation of Norway and Scotch pine on Martha's Vineyard every tree was topped by rabbits.

Damage by the red squirrel is said to be important though inconspicuous. It has been identified in Connecticut, Massachusetts, and southern New Hampshire. During periods of deep snow when the squirrel can not get its usual food, it feeds on the buds of Scotch pine, Norway spruce, European larch, and northern white pine. Trees only a few feet tall are attacked, and the upper limit of damage is unknown. Another offender is the mouse, which during occasional periods of overpopulation sometimes girdles young planted trees, especially Scotch pine.

The only bird complained of by the committee as damaging forest trees in the region is the grosbeak, which feeds on the buds of hardwoods and some conifers such as European larch. The grosbeak can not cut buds from branches too slender to support its weight, and so its feeding has little adverse effect on growth of older trees of most species.

* * *

A permanent station for research in soil erosion is to be established during the summer of 1931 in southern Wisconsin, through cooperation of the University of Wisconsin and the Federal Forest Service, Bureau of Chemistry and Soils, and Bureau of Public Roads. For the support of the work during the fiscal year 1932 a Federal appropriation of $15,000 has been made available and $10,000 has been allotted from university funds.

Government Revises Specifications for Preservative Treatment of Wood

Specifications under which wood products treated with preservatives are purchased by the United States Government were reconsidered during 1930 by the technical committee on wood preservation of the Federal Specifications Board. (This committee has as its chairman R. K. Helphenstine, jr., of the Department of Agriculture, and includes representatives of the Treasury, War, Navy, and Commerce Departments and the Panama Canal.) As a result some revisions have been proposed by the committee and approved by the Federal Specifications Board. Aside from being divided into five parts, the revised specifications differ only slightly from those adopted in 1926. In certain cases a somewhat heavier absorption is stipulated, and a specification for zinc chloride treatment of lumber for building construction has been added. The specifications remain largely identical with those of the American Wood Preservers' Association. The schedule of recommended practice in the preservative treatment of timber which forms a part of one of the revised specifications can be obtained by writing to R. K. Helphenstine, United States Forest Service, Washington, D. C.

Washington's Douglas Fir Mine Timber Production

About 2,500,000 lineal feet of round, peeled Douglas fir mine timbers, commonly called Jap piling, are produced annually in the State of Washington for shipment to Mexico. These timbers have a minimum top diameter of 4 inches and a maximum butt diameter of 10 inches. They are cut in 18, 20, 22, and 24 foot lengths. Douglas fir mine timbers prepared in Washington for local use vary from 6 to 12 inches in top diameter and from 6 to 14 feet in length. At present the bulk of this material is cut from farm woodlands. Round and split Douglas fir mine timbers produced in the State annually amount to about 4,250,000 lineal feet.

◆

Very successful plantations of longleaf, slash, and loblolly pine have been established by the Industrial Lumber Co. since 1928 on 5,000 acres of its cut-over land near Elizabeth, La. Firebreaks divide the plantations into 160-acre blocks.

◆

The American Smelting & Refining Co. of Tacoma, Wash., uses about 36,000 lineal feet of green Douglas fir poles weekly in the smelting of copper ore. The green poles, 25 to 28 feet long and 7 to 11 inches in butt diameter, are placed in the molten ore to facilitate the separation of the copper from the slag.

Sawmilling for 102 Years

By W. R. Mattoon, United States Forest Service

On the banks of the Mississippi River at Natchez, Miss., is a sawmill plant that has been operated continuously by the same family for more than 102 years. It was established in 1828 by one Andrew Brown, a native of Scotland who had mined gold in Australia. In 1865 B. F. Learned, the founder's son-in-law, entered the business and the word "company" was added to the name of Andrew Brown. Since 187 the firm has borne the name of Learned. The present head is Andrew Brown Learned, a grandson of the founder.

The mill's output is some 60,000 to 100,000 board feet daily. The lumber, which is of cottonwood and willow with a little cypress, is manufactured accurately and graded scrupulously. "If Mr. Learned caught a man doping the grade he would fire him," the mill superintendent told me. "A man that will cheat the customer will be likely also to cheat the company." The plant is in splendid shape from top to bottom. The mules at work about the mill are of exhibit grade. The lumber piles are models. Everywhere around the plant is evidence of care, accuracy, and honesty in cutting logs into lumber and merchandising the product.

The visitor is shown the time-worn cash-account book of Andrew Brown dating from March 1, 1829, the year after operations started. It shows painstaking attention and pen work. Incidentally, those were the days of slave labor. One entry reads "September 25, 1829. Paid for Boneypart—$600." For those days of real money the company's cash-account book shows many items ending in one-half cent or three-fourths of a cent.

◆

The Chicopee Manufacturing Co. recently planted 20,000 loblolly pine seedlings on abandoned farm land within its holdings near Gainesville, Ga. This is the third year in which the company has carried out planting operations in accordance with a plan prepared by the Georgia Forest Service for the management of its forest land. The company has 3,000 acres of land under organized fire protection. All open areas that will not restock within a satisfactory length of time are being planted with seedlings purchased from the State nursery at Athens.

◆

Six caterpillar tractors are being used by the Simpson Logging Co. in a selective cutting operation in Douglas fir near Shelton, Wash. Athey trusses are employed for yarding and a specially built steam jammer for loading. With this equipment it has been possible to remove groups of trees of saw-timber size without any considerable damage to dense young growth surrounding them.

tin Moth Quarantine Area Enlarged

n amendment to the satin moth quarantine regu- ons effective February 1 increased the regulated a by more than 9,000 square miles. The greatest ition in any State is 6,713 square miles in eastern ine. Other sections added include 21 towns of tral New Hampshire, 10 towns of eastern Vermont, towns of western Massachusetts, and 38 towns of tral Connecticut. No change was made in the ulated area in the State of Washington.

he satin moth feeds on the leaves of poplar and ow trees. The caterpillars pass the winter on the k of the trees, in webs so small and inconspicuous that it is impracticable to determine their presence by inspection. Accordingly, it is necessary to prohibit shipment of poplar and willow trees from infested areas.

◆

Legislation approved in the closing hours of the Seventy-first Congress provides for making a national park of Isle Royale, in Lake Superior. Because of the rugged formation of this island its old-growth timber has remained uncut. Its wild life includes moose, caribou, beaver, and deer. Lands already in public ownership make up 9,121 acres of the island's total area of 123,520 acres, 2,240 acres being in State ownership.

Foreign Notes

Sweden's National Forest Census

roductive forest land composes 57,000,000 acres of eden's total land area of 101,000,000 acres, according results of the national forest inventory carried out 1923–1929. This figure omits land occupied by ad-leaved forests above the coniferous timber line other land having a wood-producing capacity of less n 14.3 cubic feet per acre per year. The survey wed that the total volume of wood (exclusive of rk) in the forests of Sweden is 50,062,000,000 cubic t and that the annual increment (exclusive of bark) ounts to 1,683,000,000 cubic feet. The latter dis- sure put to rest the fear formerly felt by Swedish esters that timber was being removed from the tion's forests faster than it was being grown.

Of the productive forest land 4,776,937 acres was onounced to be in need of drainage; 2,397,117 acres it was being pastured.

The average number of trees 10 centimeters or more diameter outside the bark at breast height was 424 r hectare of productive forest land; that of trees 20 ntimeters or more in diameter was 89 per hectare. e peeled volume of trees at least 10 centimeters in ameter totaled 1,236,380,000 cubic meters, averaging .8 cubic meters per hectare. Of this total volume 7,610,000 cubic feet was pine, 515,540,000 cubic feet s spruce, and 142,600,000 cubic feet was birch. nnual growth (exclusive of bark) for all trees except oad-leaved trees of less than 5 centimeters diameter tside bark aggregated 47,651,700 cubic meters and eraged 1.99 cubic meters per hectare of productive rest land. This total included 18,157,100 cubic eters of pine, 19,812,500 cubic meters of spruce, and 989,800 cubic meters of birch. The volume increment rcentage was found to be 3.25 for all coniferous trees; r trees having a diameter of 10 centimeters or more was 2.86 for conifers and 3.33 for broad-leaved ecies.

In preparation for the Swedish national forest survey a test survey covering the whole Province of Värmland was made in 1911. The delay in beginning the survey on a large scale was due to the war. The committee under which the work was carried out is headed by Henrik Hesselman, head of the Government forest research bureau. Other members are Josef Östlind, a director of the Government pension bureau; Tor Jonson, president of the Royal Forestry College in Stockholm; and W. Ekman, president of the Korsnäs Lumber and Pulp Mill.

The sample areas surveyed were parallel strips 33 feet wide. In northern Sweden the strips were from 6.2 to 12.4 miles apart; in the central and southern Provinces the interval varied from 0.6 to 3.1 miles. The survey lines were for the most part drawn at right angles to the main topographical direction, which resulted in their running in a southwest to northeast direction in the northern part of the country and in an east-west direction in the central and southern parts. During each of the summers of 1923–1929 a force averaging more than 100 men was in the field, working in crews of 8 or 10 with a forest engineer at the head of each crew. Field work occupied a total of 31 months. The field parties surveyed 32,300 miles and examined more than 180,000 test trees. Calculations made to ascertain the reliability of the sample method adopted in the survey justify the claim that the results for the entire country in regard both to area of productive forest land and to cubic volume and increment do not diverge more than 2 per cent from the results that would have been obtained had the entire country been covered with survey strips 33 feet wide and the same methods of procedure used.

Government-owned forests make up 16 per cent of the total in Sweden; 6 per cent of the total forest area is in other types of public ownership, and 29 per cent is owned by private companies. Forest products represent half the nation's annual income from exports.

Reforestation in the "Zone Rouge" of the Meuse

Reforestation of war-devastated land in the Department of the Meuse, France, was begun on a large scale in 1929 as a project of the national administration of forests and waters. A law of 1919 had provided for Government acquisition of such war-devastated lands as could not be restored at an expense justified by their prospective value following restoration. Under a law of 1923, such parts of the "zone rouge" as were still susceptible of agricultural use were portioned off and placed on sale, and the remainder was incorporated into the public domain to be improved by reforestation. The lands thus turned over to the control of the administration of forests and waters amount to 13,582 hectares and are situated in 41 communes. The two units of greatest importance are those of Morthomme and Verdun, containing 3,103 hectares and 9,270 hectares, respectively.

These two units have been divided into 17 large sections bounded by highways or railroads; these sections, in turn, have been cut into 637 blocks containing an average of 20 hectares each, bounded by 476 kilometers of firebreaks, lanes, and paths. As a rule the firebreaks are 10 meters wide and the lanes and paths 6 meters and 3 meters wide, respectively. Identifying numbers have been given to the small units of land.

The only restorative work done on the soil is a rough leveling of the lanes and paths. Road building has been preceded by the clearing away of wires and explosives. The cost of the leveling and preparation of the lanes and paths in 1929 and 1930 was 50 francs per hectare. Military roads have been utilized whereever possible.

The area to be forested includes 8,789 hectares of land not forested prior to the war; 3,414 hectares of land on which there exists some timber or some reproduction of willow, hazel, or various worthless species; and 171 hectares of land occupied by marshes antedating the war or resulting from it. Nearly everywhere the compact calcareous clay has been deeply disturbed. The terrain is rough, with abrupt slopes. Altitude varies from 200 to 388 meters.

On land not wooded before the war, both sowing and planting have been practiced. Seed spots one-half meter square spaced 2 meters apart each way have been cultivated to a depth of from 20 to 25 centimeters. The spring following their preparation these spots were sown with Austrian pine and Scotch pine alternating in rows, 2 kilograms of Austrian and 1.5 kilograms of Scotch pine seed being used on each hectare. Three years after the sowing, some of the seedlings are to be lifted and transplanted between the rows. This system is favored as making it possible to utilize labor during the summer and as modifying risks: in 1929 the catch of the seed spots was 90 per cent, whereas that of the plantations was only 50 pe cent. In establishing plantations, 4,444 plants hav been used per hectare, with a spacing of 1½ meter b 1½ meter. In general the plan has been to use costly coniferous species in part and to fill in with broad-leaved species of less value. Austrian pine ha been mixed with alder or birch on dry land or o southern exposures; spruce, Douglas fir, or Japanes larch has been mixed with ash, sycamore, or acaci on cooler land or land having a northern exposur On land partially wooded or bearing a stand of reproduction Austrian pine or acacia has been used on southern slopes, and on other exposures silver fir has been used in the proportion of 500 plants per hectare. Silver fir is used, likewise, in seed spots under reproduction. On swampy terrain use is made of 2-year poplar cuttings 2 to 2½ meters in height and spaced 5 or 6 meters apart each way.

In the work executed by the administration itself, manual labor is obtained locally by advertisement, women being employed whenever possible. The concern to which a contract was awarded for a large part of the work recruits its workers in the poor sections. Barracks for workers have been erected close to the lands to be reforested.

The work has kept pace with the program decided upon in advance and sometimes has outstripped it. Barring exceptionally unfavorable weather conditions it is expected that the project will be completed in 1934.

Douglas Firs in Belgium Make Good Growth and Produce Excellent Seed

Foresters who attended the congress of silviculture held in Antwerp in 1930 and subsequently participated in a tour of Belgian forests were particularly struck by the good growth of Douglas fir in the arboretum of the Forest of Cédrogne, writes L. Pardé in the Revue des Eaux et Forêts. On one plot of Douglas fir planted in pure stand in 1902, the cubic content of 25 individual trees totaled 11 cubic meters in 1930. The average tree measured 13 meters in height and 86 centimeters in circumference. On another plot where Douglas fir had been planted in 1902 in mixture with spruce, 42 Douglas firs were found in 1930 to have a content of 17.145 cubic meters and 33 spruces represented a volume of 3.911 cubic meters; the average tree, for the Douglas firs, was 14 meters in height, 0.8 meter in circumference, and 0.408 cubic meter in volume; the spruces averaged 8 meters in height, 0.5 meter in circumference, and 0.118 cubic meter in volume. The figures for the second plot represent a volume per hectare, at the age of 28 years, of 331 cubic meters, including 270 cubic meters of Douglas fir and 61 cubic meters of spruce.

At the Forest of Cédrogne there have been harvested 2,700 kilograms of cones of Douglas fir which have duced 27 kilograms of seed. The expense of ghering the seed was 1 franc 30 centimes per kilogm. The seed showed a germination percentage of 3

The Forest of Cédrogne is situated on a gentle slope wh a south-southwest exposure, at an altitude varying fm 485 to 605 meters. Frosts occur from the last September till June. Snow is abundant, and annual rnfall averages 1,200 millimeters. The soil is of god quality.

At Saint-Jean, the estate of the late Count Adolphe d Limburg-Stirum, once president of the Société Cntrale Forestière de Belgique, the visitors saw a stand d Japanese larch, established in 1905, of which six iividuals measured from 78 to 95 centimeters in dcumference at breast height in 1930.

Government Control of Forests in Portugal Extends to Private Land

In Portugal the Government controls forest managent on communal land and also on private land within aeas the reforestation of which is declared to be a pblic benefit. Private owners of land not included i such areas who wish to reforest their land or to mnage it for sustained yield may choose to have their oerations supervised by the Government. Communal lnds under the management of Government foresters tal about 48,164 hectares; private lands on which frestry management is supervised by the Government agregate 196,384 hectares.

Communal forests of great extent and great value ae said to have existed in Portugal in the past on land nw deforested and used only for pasture. At such a rte as its resources and personnel permit the national frest service is undertaking the reforestation of cnuded communal lands entirely at Government epense, guaranteeing to the communes that in the fture revenue will be proportional to expense and t the estimated value of the land. While the improvent of such land is in process the Government egages to pay into the communal treasury an annuity crresponding to the average revenue from the land dring the 10 years preceding the initiation of the frestry work. This annuity usually amounts to ry little or to nothing at all, since most of the comunes exercise no proprietary rights over their waste lnd.

In the case of lands placed under the management the forest service at the owner's volition, the task the forest service is merely to see that the owner heres to a plan of management to which he has reed.

Portugal's forest resources are still sufficiently tensive that the nation exports greater quantities wood products than it imports. Forest stands cupy 22 per cent of the country's total area. Nevereless, according to the estimate of Director General of Forests Borges, reforestation is needed on nearly 30,000 hectares of dune land and 1,200,000 hectares of mountain land.

Excellent results have been obtained on 20 areas where reforestation work has been initiated by the Government since 1901. Recent action of the Legislature of Portugal provides for extension of this work.

Distribution of Trees in Victoria

Discussing the subject "The factors controlling the distribution of trees in Victoria" before the Royal Society of Victoria, Australia, in December, 1929, Reuben T. Patton spoke in part as follows:

Some trees, as, for instance, *Eucalyptus globulus*, do not seem to follow any law as regards distribution. The same applies to the snow gum, *E. coriacea*. The latter has the capacity to withstand the cold and depth of winter snows at a little below 6,000 feet elevation and is the only tree species that can. We find this species, however, on the undulating Silurian country at Yering and on the Tertiary formation at Dandenong, only a little above sea level. It occurs on the dry Silurian shales at Eltham, but it does not occur on the mountains to the northeast about Healesville. Very similar is the distribution of *E. globulus*. It occurs on the cool seaward face of the cliffs at Kalimna and comes down almost to the edge of the water. It is found on the dry northern slopes of the granite hills at Trawool, and, as a striking contrast to this, it occurs abundantly in the Otway Forest. These habitats do not appear to be related in any way. Such examples of distribution are unexplainable except on the assumption that these species are not specialized as regards habitat and will develop anywhere provided they are not crowded out by the local vegetation. Each of the areas where these two species are found, apart from the alpine home of *E. coriacea*, are typically habitats of other species or groups of species. The distribution of species of Eucalyptus, then, as well as species of other genera, shows that they * * * are in equilibrium with their environment. In other words, a climax condition exists, and therefore it follows that these areas have not been recently, or comparatively recently, subject to disturbing influences. Yet it is held by many, who have only a superficial knowledge, that fire has been an active agent in distribution and that the present associations are in a large measure the result of fire. If fire had been as intensive in its destructive power in the past as it has been since the advent of the white man we would surely find evidence of active succession. * * * It is maintained by supporters of the fire theory that evidence of adaptation is to be found in the protective defence of the rough, thick bark of the various eucalypts. Unfortunately for this theory, the thickest and most protective barks, e. g., *E. sideroxylon*, occur in areas where fires are infrequent and of no consequence.

* * * In the secluded gullies * * * the presence of large trees of such a sensitive species as *Nothofagus cunninghamii* is surely evidence of the absence of fires over long periods of time. The large root burls of the musk tree, *Olearia argophylla*, are indicative of extreme age. The common dogbush, *Cassinia aculeata*, is most frequently seen as a shrub, but in gullies where fire has been absent since the advent of the white man it may be found as a small tree, and even colonies of it are to be seen. All of these trees are readily destroyed by fire and their presence as large

trees is evidence that fire has been absent. * * * Since the advent of the white man, firing of the forest has shown that ultimately the forest area will be reduced to bracken fern. There is a retrogressive succession. The change may be rapid or it may be slow, and in the succession other plants, as *Cassinia aculeata*, may obtrude themselves; but ultimately the end point is the same, bracken fern. This plant exists spasmodically in the forest area. It can not succeed where forests occur since it is strongly light-demanding. Its rhizome is unaffected by fire and in the regrowth after the fire the bracken fern rapidly makes its appearance. Its subsequent growth is largely a matter of how much of the crown canopy of the forest has been destroyed. Repeated firings open up the crown canopy more and more, thus giving the fern the necessary light. The large stores of food material in the rhizome give the bracken a great advantage over plants which have to arise from seed. The latter are ultimately choked out when bracken is dense. When the white man first arrived the wide areas of bracken now seen did not exist, nor were there extensive areas of dead timber. Fire is steadily changing the face of the forested areas.

Quebec Forest Protective Associations Report Slight Losses in 1930

The Laurentian Forest Protective Association, Quebec, patrolling 7,750,151 acres of land in 1930, had only 29 acres burned over during the year. Fires numbered 17. The first fire occurred on May 9, the last on October 15. The only other months for which fires were reported were June and August. Fire-fighting costs for the year were $461.48, of which $190.18 was borne by the association members and the remainder by the Government.

The association's permanent field staff was composed during 1930 of 3 chief inspectors, 1 general inspector, 18 divisional and assistant inspectors, 52 tower observers, 80 patrolmen, 114 auxiliary fire rangers, 4 central telephone operators, 5 radio telephone operators, and 27 special permit issuing officers.

Patrol of the Canadian National Railway's right of way between Riviere-a-Pierre and Hervey Junction was carried out by the association under contract, a power speeder being operated between these points at a cost to the railway company of $650. A fire-fighting tank car with 3,000-gallon capacity, equipped with hose and tools, was placed at Lake Edward, in the center of the association's territory. In the eastern section a patrol boat was operated between Quebec and Seven Islands from June 3 to November 1.

Four new towers were built on the protective area during the year. The association's wireless telephone system was extended, stations being established at the Curtiss Reid hydroplane base at St. Felicien and at two observation towers.

Four primary weather stations were maintained, from which a complete record of data was telegraphed to Toronto daily.

The rate of assessment for the year averaged about 0.016 cents per acre.

The St. Maurice Forest Protective Association, a Three Rivers, Quebec, reports that 48 fires occurred i 1930 on the 8,910,380 acres of land which it patrolled This is the largest number of fires reported by the association since 1923. The acreage burned over, however was small; 25 of the fires burned over less than 1 acr and only 2 burned over more than 100 acres. Travelers, hunters, and fishermen were held responsible fo 15 fires; forest workers, for 7; and railways, for 4 Lightning was reported to have caused 7 fires, or 1 per cent of the total. Fires occurred in each month o the period April-October, inclusive. The total rate o assessment levied on the 14 members of the association during the year was 1½ cents per acre.

During the most dangerous period there were 270 regular rangers on the association pay roll; auxiliary rangers totaled 230. Three new 80-foot towers wer constructed, and four towers were raised in height from 60 to 80 feet. Telephone lines constructed during the year at association expense totaled 70 miles. Rangers remaining on duty after the spring fire season cleaned 939 miles of old trails and cut 38¼ miles of new trails.

As usual, the association maintained the Dominion meteorological bureau forecasting station at Manouan in cooperation with the Quebec Forest Industries Association.

Cooperative Reforestation in Ontario

Eleven county forests of 1,000 acres or more each have been established in Ontario under the Province's cooperative plan. Dufferin, Norfolk, Ontario, Victoria, Prescott and Russell, and York Counties have one such forest each, and Simcoe, Northumberland, and Durham Counties have two each. The provincial government's offer to counties is that it will plant and manage for 30 years tracts of 1,000 acres or more of suitable land purchased by counties for reforestation At the end of that period the county may choose either to resume control of the property, paying to the Province without interest the amount that has been spent on planting and management; to relinquish claim to the property and receive the purchase price from the Province, without interest; or to share equally with the Province in the forest's management costs and earnings

More than 80 municipal forestry demonstrations have been established under the Ontario Government's offer to supply and plant trees free of charge on small pieces of land suited for forestry demonstrations and made available for that purpose by municipalities.

Crown lands which Ontario is reforesting include a sand-dune area of 500 acres in Prince Edward County, about 10 miles from the town of Picton. This consists in a finger-shaped peninsula extending for 5 miles between Lake Ontario and West Lake. The base of the peninsula is about three-quarters of a mile wide and borders on forested and farming land. The northwest wind sweeping across Lake Ontario strikes one section of this area, and for many years the sand has een slowly encroaching on valuable timberland and ood agricultural soil. It is estimated that since this art of the Province was first surveyed, in 1852, 85 cres of farm land alone has been covered or spoiled by he drifting sand. Plots of Crown land in northern ntario are being planted for demonstration purposes. n addition the provincial forestry organization has lanted large areas such as the Kirkwood "desert" orth of Thessalon. In 1930 this type of work was xtended and more than 3,000,000 trees were set out n the northern forest districts.

Provincial nurseries in which forest planting stock is rown from seed are located near St. Williams, in Norfolk County, on the north shore of Lake Erie; at Orono, n Durham County; and at Midhurst, in Simcoe County. transplant nursery is maintained at the Sand Banks, n Prince Edward County. In 1930 the trees distributed from these nurseries totaled more than 10,000,000. n that year trees were supplied to 6,000 persons. Most f the trees were distributed free, the recipients paying xpress charges. For reforestation purposes any resident of the Province is allowed 3,500 trees a year free nd may obtain additional quantities at $4 per 1,000. For windbreak planting 500 spruce and cedar are supplied free to any resident.

At each of the three nurseries where stock is grown rom seed, forest plantings have been made for demonstration purposes. In some of these, particularly at the St. Williams nursery, which was established in 1905, the trees are now 30 feet and more in height.

For some years it has been the policy of the Ontario Department of Forestry to gather all the tree seed it requires for reforestation work. All seed is gathered on a piece-work basis. During the past two years alone there have been harvested for the use of the Province more than 17,000 bushels of Norway pine cones, 6,000 bushels of northern white pine cones, 1,500 bushels of jack pine cones, 4,000 bushels of white spruce cones, 1,200 bushels of walnuts, and smaller quantities of cones of Scotch pine, cedar, and hemlock, butternuts, and seed of ash, maple, elm, cherry, birch, and oak. The Province maintains at Angus an extracting plant with drying sheds having a storage and drying capacity of 50,000 bushels of cones. The extracting chamber is capable of holding 300 bushels of cones at a time.

* * *

M. Tanasesco-Mosandrei, late inspector general of forests of Rumania, bequeathed 1,050,000 lei to the forestry society Progresul Silvic, Bucharest, as a scholarship fund for Rumanian students in the École des Eaux et Forêts of Nancy, France, of which he was an alumnus. The scholarship is to be awarded to a forestry student of the École Polytechnique of Bucharest on the basis of the results of a competitive examination held in the French language.

Personals

E. F. McCarthy, director of the Central States Forest Experiment Station, has been chosen to succeed the late John W. Stephen as head of the department of silviculture, New York State College of Forestry. Mr. McCarthy previously taught in the college for a period of nine years. He served for six years as a silviculturist at the Appalachian Forest Experiment Station and has been director of the Central States station since it was first established in 1927.

W. R. Hine has resigned as executive secretary of the Society of American Foresters, because of illness. He is succeeded by Franklin W. Reed, who leaves a position as industrial forester for the National Lumber Manufacturers Association. Mr. Reed's career in forestry, for which he was trained at the Biltmore Forest School, includes long experience in the Government service. He held a series of administrative positions in the United States Forest Service, including those of associate district forester in the Intermountain Region and district forester in the Eastern Region. Before entering the employ of the National Lumber Manufacturers Association in 1928 he engaged for some time in private consulting forestry work.

M. B. Pratt has been reappointed State forester of California, after three terms in that office.

M. J. Fox, of Iron Mountain, and Philip K. Fletcher, of Alpena, have been appointed to succeed E. C. Voght and Lee J. Smits as members of the Michigan Conservation Commission.

Conrad L. Wirth has been appointed assistant director of the National Park Service in charge of the branch of lands, succeeding the late W. B. Lewis.

Herbert S. Jackson has resigned as head of the department of botany in the Purdue Agricultural Experiment Station to accept the position of professor of mycology and cryptogamic botany in the University of Toronto.

Herbert S. Gilman, of Los Angeles, R. C. Harbison, of San Bernardino, Swift Berry, of Camino, E. Walton Hedges, of San Juan, and B. A. McAllaster, of San Francisco, have been appointed to the California State Board of Forestry. Charles S. Howard, of San Mateo, and Mr. McAllaster have been elected chairman and vice chairman, respectively. The seventh member of the board is Ernest G. Dudley, of Exeter.

DuPre Barrett, for some time in charge of the forestry work of the Georgia State College of Agriculture, is now extension forester for the college, collaborating with Extension Forester K. S. Trowbridge.

Fellowships for advanced training in forestry during the coming year have been awarded by the Charles Lathrop Pack Forest Education Board to seven foresters, including six Americans and one Canadian. The successful candidates, their status at the time of the awards, and their plans for the year are as follows: Ralph Caird, graduate student University of Michigan, to continue investigations in normal and pathological tree physiology and to continue general study of forestry begun under Charles Lathrop Pack fellowship awarded in 1930; John Broughton Fortin, senior New York State College of Forestry, graduate work in silviculture; Bernard Frank, graduate student University of Wisconsin, to continue study and research in land utilization begun under Charles Lathrop Pack fellowship awarded in 1930, with special emphasis on land-classification methods and tax-delinquent lands, together with advanced studies in economics and statistics; Frank Avery Ineson, student Forest Academy, Hann. Münden, Germany, nine months' graduate study at the School of Forestry and Conservation, University of Michigan, in forest management and utilization; Harold John Lutz, assistant professor of forestry Pennsylvania State College, to make an ecological study of the plains areas in southern New Jersey in partial fulfillment of requirements for the Ph. D. degree from the Yale School of Forestry; Willis Westlake Wagener, forest pathologist, United States Department of Agriculture, San Francisco, Calif., to do advanced research in forest pathology in partial fulfillment of requirements for the Ph. D. degree from the Yale School of Forestry; Horace Peterson Webb, consulting forest engineer, Loggieville, New Brunswick, Canada, to make an investigation of seasonal versus year-round logging in the pulp and paper industry of eastern Canada.

E. M. C. Eddy, formerly an employee of a fuse company, has been brought into the Connecticut State forestry organization to instruct local wardens in fire-protection methods and to take charge of suppressing large fires in the portion of the State west of the Connecticut River. Mr. Eddy has had about 20 years' experience in fighting fire. While with the fuse company he was responsible for the protection from fire of woods in which large quantities of explosives were stored at all times.

Mark M. Lehrbas has joined the staff of the Southern Forest Experiment Station, for work in connection with the national survey of forest resources. Mr. Lehrbas joined the United States Forest Service in January, 1928, and since that time has been engaged in appraisal of timber and lands in the Eastern Region.

John McLaren, fire-control inspector of the United States Forest Service, has accepted a transfer from the Northern Region, with headquarters at Missoula, Mont., to the Lake States Region. There he will be engaged primarily in land-acquisition work.

J. A. Putnam has joined the staff of the Souther Forest Experiment Station and has been assigned t the hardwood survey. Mr. Putnam was attached t the station in 1928 and assisted at that time in a surve of the bottom-land hardwoods of Louisiana. In th interim he has had two years of practical wood work as forester for the Thistlethwaite Lumber Co Opelousas, La.

Charles A. Connaughton has been transferred from the Boise National Forest, Idaho, to the Intermountain Forest and Range Experiment Station, Ogden, Utah He will assist in forest management research dealing primarily with methods of cutting and with natura reproduction of western yellow pine.

Ray F. Bower has joined the faculty of the New York State College of Forestry, and has been assigned to the extension department. Since receiving the B. S. degree in forestry from the Michigan State College in 192 Mr. Bower has been employed as assistant in the division of forestry of the Ohio Agricultural Experimen Station.

C. L. Perkins has resigned as supervisor of the Monongahela National Forest, W. Va., and is now forester on a privately owned estate of 10,000 acres near Ligonier, Pa. Arthur A. Wood is being transferred from the supervisorship of the Nantahala Nationa Forest, N. C., to that of the Monongahela. John Byrne, assistant supervisor of the Pisgah Nationa Forest, N. C., has been designated to succeed Mr Wood. William P. Kramer, for 10 years supervisor of the Luquillo National Forest, Porto Rico, and insular forester for Porto Rico, will take the position vacated by Mr. Byrne. William R. Barbour, now forester in the Virgin Islands, will succeed Mr. Kramer. Eugene V. Roberts is to be transferred from the Choctawhatchee National Forest, Fla., to take charge of forestry work in the Virgin Islands.

John F. Campbell is being promoted from the position of assistant supervisor of the Deschutes Nationa Forest, Oreg., to that of supervisor of the Fremont National Forest, Oreg. Gilbert D. Brown, whom he succeeds, is taking over the supervisorship of the Wenatchee National Forest, Wash., on the retirement of A. H. Sylvester.

H. D. Story and H. G. Wallace have been made district foresters in the Georgia Forest Service. Mr. Story, who is a forestry graduate of the Louisiana State College and has been employed in Georgia in connection with the southern forestry educational project of the American Forestry Association and cooperators, is stationed at Albany, with headquarters at the Gordon Hotel. Mr. Wallace, a forestry graduate of the Georgia State College of Agriculture, is stationed at Columbus, with headquarters at the chamber of commerce rooms.

Members recently appointed by the Secretary of griculture to the regional forest research advisory uncils are the following: Appalachian, Chapin Jones, ate forester of Virginia; J. S. Holmes, State forester North Carolina; J. O. Hazard, State forester of ennessee; H. S. Newins, State forester of West Vir- nia; H. A. Smith, State forester of South Carolina; homas P. Cooper, director, Kentucky Agricultural xperiment Station; Julian A. Burruss, president, irginia Polytechnic Institute; William J. Hutchins, esident, Berea College; Reuben B. Robertson, presi- ent, Champion Fibre Co., Canton, N. C.; Paul R. amp, vice president, Camp Manufacturing Co., ranklin, Va.; John Raine, president, Meadow River umber Co., Rainelle, W. Va.; Thomas H. Claggett, hief engineer, Pocahontas Coal & Coke Co., Bluefield, . Va.; S. F. Horn, editor, the Southern Lumberman, ashville, Tenn.; W. D. Tyler, vice president, Clinch- eld Coal Corp., Dante, Va.; Joseph Hyde Pratt, onsulting engineer, Chapel Hill, N. C.; Verne Rhoades, onsulting forester, Asheville, N. C.: Central States, H. Skinner, director, Purdue University Agricultural xperiment Station; William Trelease, professor meritus of botany, University of Illinois; Thomas L. heeler, editor, Indiana Farmers' Guide, Huntington, nd.; Charles F. Huhlein, Louisville, Ky.: Northeastern, eorge T. Carlisle, consulting forester, Bangor, Me.; . L. Violette, forest commissioner of Maine; P. H. errill, State forester of Vermont; W. G. Howard, uperintendent of lands and forests of New York; . A. L. Bazeley, State forester of Massachusetts; R. S. Hosmer, New York State College of Agriculture; Hugh P. Baker, New York State College of Forestry; E. H. Thompson, president, Federal Land Bank, Springfield, Mass.; R. W. Thatcher, president, Massachusetts Agricultural College; J. C. Kendall, director, New Hampshire Agricultural Experiment Station; Harry R. Lewis, commissioner of agriculture of Massachusetts; A. F. Hawes, State forester of Connecticut: California, Robert G. Sproul, president, University of California; E. E. Brownell, director, California Woolgrowers' Association; Francis Cuttle, Tri-Counties Reforestation Committee; Charles G. Dunwoody, director, conservation department, California State Chamber of Commerce; H. S. Gilman, president, Angeles Forest Protective Association; Duncan McDuffie, State Parks Council; H. M. Robinson, president, Los Angeles First National Trust and Savings Bank; Willis Walker, vice president, Red River Lumber Co., San Francisco: Allegheny, Edmund O. Ehrhart, forester, Castanea Paper Co., Johnsonburg, Pa.

William P. Apgar has been named as director of the Savenac Nursery of the United States Forest Service, at Haugan, Mont., succeeding G. Willard Jones, who has been transferred to the Lake States Region to establish a nursery at Rhinelander, Wis. Mr. Apgar comes from Halsey, Nebr., where he has served as director of the Bessey Nursery of the Forest Service.

Floyd W. Godden, junior forester on the Salmon National Forest, Idaho, has been promoted to an assistant supervisorship on the Idaho National Forest.

Bibliography

Run-off and Erosion on Utah Watersheds Greatly Influenced by Density of Herbaceous Cover

By R. S. Campbell, United States Forest Service

The second large-scale study of run-off and erosion hat has been made in this country is reported in a ecent bulletin [2] by C. L. Forsling, director of the In- ermountain Forest and Range Experiment Station, Ogden, Utah. The first such study was conducted by he Federal Forest Service and Weather Bureau over period of 19 years at Wagon Wheel Gap, Colo. Whereas the Wagon Wheel Gap study was designed to ring out the results of gradual depletion of forest over by cutting, the study reported by Mr. Forsling ad to do with watersheds devoid of timber and was intended to bring out the rôle of herbaceous and shrubby vegetation in controlling run-off and erosion, particularly as affected by grazing. The findings are of vital interest to range livestock owners, irrigation farmers, other water users, and conservationists in general.

The study was made on two adjacent small but complete watersheds in Ephraim Canyon, on the Wasatch Plateau, Utah. Watershed A, containing 11.244 acres, was used as a variable. Watershed B, containing 8.972 acres, served as a constant. Equipment was installed to measure precipitation, run-off, and sediment removal.

The vegetation on watershed A constituted 16 per cent of a complete cover at the outset of the study, in 1915, having been heavily depleted by overgrazing. It was grazed closely enough to limit it to 16 per cent of a complete cover through 1919; from 1920 until 1924 it was not grazed and the density of its vegetation was increased, by natural and artificial reseeding, from 16 per cent to 40 per cent; from 1925 to 1929 it was moderately grazed each year, except in 1926, and was maintained at 40 per cent of a complete cover. The vegetation on watershed B was grazed each year throughout the experiment and was maintained at 40 per cent of a complete cover.

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[2] A Study of the Influence of Herbaceous Plant Cover on Surface Run- ff and Soil Erosion in Relation to Grazing on the Wasatch Plateau in Utah. Technical Bulletin 220. Copies may be obtained free of charge, s long as the supply lasts, from the Office of Information, U. S. Depart- ment of Agriculture, Washington, D. C.

Precipitation on the study areas averaged 29.51 inches per year. Each year two fairly distinct periods of surface run-off occurred: The season of melting snows, during May and June, and that of summer rains, during July, August, and September. The mean seasonal precipitation during the July-September period was 4.99 inches, or 16.9 per cent of the average annual precipitation. Soil moisture studies indicated that the summer rains failed to penetrate deeply and that water from melted snow was the only moisture which contributed to the underground supply. When watershed A had a 16 per cent cover of vegetation summer rain storms produced 4.6 per cent of the average annual surface run-off; but this small run-off caused 84.5 per cent of the erosion. When the area had a 40 per cent cover summer rains produced only 1.3 per cent of the annual run-off, but run-off from summer rains caused 65.8 per cent of the erosion. The quantity of sediment eroded by run-off from summer rains varied more or less directly with the quantity of run-off but was influenced to some extent by the rate of run-off, the trampling of livestock, and the moisture content of the soil when a storm sufficient to cause run-off occurred. Some of the soils were granular and were eroded easily when they were dry but not so easily when they were wet.

Because rainfall was less in the 1924–1929 period than in the 1915–1920 period, no satisfactory conclusions could be arrived at by comparing records for the two periods. Comparison of the run-off and erosion records for watershed A with those for watershed B indicated that surface run-off from rainfall was 64 per cent less, and erosion resulting from this run-off 54 per cent less, on the area with a 40 per cent complete herbaceous cover than on that with a 16 per cent cover. Greater density of cover did not affect the quantity of run-off from melted snow; consequently the net difference in average annual surface run-off was only 3.3 per cent. Erosion from melted snow, however, was 57 per cent less on the watershed with a comparatively dense herbaceous cover than on the depleted watershed. In commenting on his conclusions Mr. Forsling writes:

> Vegetation aided in checking erosion in the following ways: By obstructing the rain where it fell and keeping the run-off spread out and reducing its rate of flow, thereby reducing sheet erosion, the establishment of shoestring gullies, and cutting along the sides and bottoms of the larger gullies; by binding the soil against erosion; by catching or straining out of the water much of the sediment being carried by run-off; and by reducing creep into the gullies of the loose soil on steeper slopes. The replacement of species with inferior root systems by plants with more extensive fibrous roots helped further to improve the absorptive capacity of the soil and bind it against erosion. The establishment of plants in the gullies aided further by damming and clogging the gullies, thus checking the velocity of the flow and reducing the carrying and abrasive power of the water and causing soil and débris to be deposited in them. Many of the smaller gullies which originally were steep sided are gradually being filled in and shallowed out.

Observations on land of similar character on which the herbaceous cover was not depleted indicate that 60 per cent of a complete cover is the maximum obtainable on watershed A.

The results of this study indicate that a normal cover of herbaceous vegetation, although probably not adequate to prevent flash summer floods, to a considerable degree does abate torrential run-off and reduce floods from sudden heavy rainstorms in mountainous regions.

Range management that will restore and maintain the maximum plant cover for grazing purposes will also assure satisfactory watershed protection except in extrême cases, Mr. Forsling concludes. For mountain watersheds in general, the most promising method of reestablishing plant cover is natural revegetation, brought about by allowing native plants to mature and disseminate their seed or revegetate in other ways. Where the cover has been badly depleted and the better surface soil washed away, where soil conditions are unfavorable, or on very steep slopes, in order to obtain natural revegetation it may be necessary to restrict forage utilization to very light grazing or to moderate autumn grazing after plant maturity, or even to exclude stock entirely. On overgrazed western mountain lands where growing conditions are favorable artificial reseeding will hasten revegetation and the control of erosion.

Growing Trees for Forest Planting in Montana and Idaho

By C. F. Korstian, Duke University

A circular destined to take its place in forestation literature as a standard reference is Growing Trees for Forest Planting in Montana and Idaho,[3] by D. S. Olson. In this 91-page publication Olson discusses the selection and development of a nursery site, soil management, and the storage of tree seed, giving examples drawn from the practice at the Savenac Nursery of the United States Forest Service at Haugan, Mont. He discusses in detail the propagation, care, and distribution of coniferous planting stock produced at Savenac, the common injuries to the stock, and methods of preventing these injuries. No one is better fitted to write such a monograph on the Savenac Nursery than Olson, who has been long and intimately connected with the nursery and has himself developed, or at least improved, most of the implements and methods in use there.

In the preface the author very aptly states that the "methods that have been developed for this particu-nursery may not be directly applicable to all nur- ies, because of differences in climate, soil, and num- r or kind of trees raised. However, they may be ed in part or adapted to fit conditions at other rseries." They may also suggest modifications in ethods used elsewhere. Throughout the circular phasis has been given to the necessity for thoroughly sting new methods and technique under the condi- ns peculiar to each nursery and locality before mak- g extensive use of them as part of the standard prac- e.

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[3] U. S. Department of Agriculture Circular 120. Copies may be obtained free of charge, as long as the supply lasts, from the Office of Information, U. S. Department of Agriculture, Washington, D. C.

One of the outstanding features of the circular is the scription of implements specially devised for nursery rk and of agricultural implements adapted, with or thout modification, for use in the various nursery erations in order to lessen the requirement of manual bor and thus reduce the cost of growing seedlings and ansplants. Along with the effort to reduce the cost producing stock an equally strong effort has been ade to obtain high survival. Especially important plements are the sand spreader (which is based on the neral principle of the ordinary manure spreader), e horsedrawn tree pruners, and tree lifters.

The method of packing trees for shipment in burlap lls, which was developed by Olson at the Savenac ursery and is used extensively in the West, is described detail. The extent to which the development of pparatus has gone is indicated by the seed sampler nd seed-measuring can. The latter has an adjust- ble sleeve so that it can be set to hold different quan- ties of seed, according to the quantity the nursery- an desires to sow in each bed.

The cost of transplanting at the Savenac Nursery has een so reduced by the improved methods developed here that in Olson's opinion the expense of obtaining igh-grade stock is unquestionably within justifiable mits. The method most commonly used is to set the eedlings in long furrows opened by a specially-de- eloped plow. The transplant board used, a modifica- ion of the Yale board, is 8½ feet long. With a spacing f 1⅓ inches between each two notches, it holds 75 rees. This was determined by stop-watch studies as he number of trees that could, by fast work, be placed n a board by one man of the crew in the length of time equired by the other man to plant a boardful. To nake this scheme effective it is necessary, of course, to group the workers in crews according to their individual ates of speed.

Another noteworthy feature of the work at the Savenac Nursery is the effort to eradicate weeds with chemicals. After summarizing the experiments described in detail by Wahlenberg [4] and after describing the method of using zinc sulphate solution, the chemical which has given the best results, Olson states that great caution should be observed in chemical weeding because after repeated applications the soil may become toxic to the trees. Direct toxic action by zinc ions is distinctly to be feared. Chemical treatment is not practiced at the Savenac Nursery when the weeding is only a small problem. In Olson's opinion this treatment is of most value where it can be used to clean up areas badly overgrown with weeds.

It seems to me that the author has made the formula for the quantity of seed to sow unnecessarily complicated-looking. It might be expressed more simply in words as follows:

$$\text{Pounds of seed required} = \frac{\text{Number of trees desired on area}}{\text{Number of germinable seed per pound.}}$$

Because of its readability, general excellence, and usefulness the circular should be read and used by all nurserymen, forest planting specialists, and teachers of forest seeding and planting.

Wood-Using Industries of Virginia

By W. D. Brush, United States Forest Service

Because of the increasing interest in timber requirements and the use of wood, a publication of the Virginia Polytechnic Institute on Wood-Using Industries of Virginia calls for special comment. This publication covers the year 1928 and was prepared by J. Elton Lodewick, professor of wood technology. It is similar in scope to one prepared in the United States Forest Service for the year 1911 and published by Virginia in 1912.

Part I of the bulletin gives a brief description of the forests of Virginia by regions and by four "main forest types," together with a list of trees of the State. Part II gives for each wood a general discussion of properties and uses and a table of quantities used, by industries. Part III discusses each of the wood-using industries of the State and gives a table for each industry showing quantities of wood used, by kinds. Part IV is a directory of wood-using firms by counties and by industries. Part V is a tabulation of the uses of each wood in the State.

The statistical tables given for each kind of wood show in addition to quantities used in 1911 and 1928 in each industry the average cost at the factory and the percentage grown in the State in each of the two years. The tables for each industry show also for the two years the average cost of each kind of wood at the factory. With a few exceptions, the quantities grown in the State are given for 1928; these quantities are not given for 1911.

No compilation is shown of total quantities of wood grown in the State. While this would evidently have involved some estimating, the resultant data might have shown with sufficient accuracy an interesting comparison between 1911 and 1928 as to the State's increasing or decreasing dependency on outside sources.

In addition to the secondary industries commonly included in State wood-using reports, the 1928 report includes the following primary industries: Tanning extract, pulp, cooperage stock, veneer, and excelsior. Of these industries excelsior only was included in the 1911 report. Consequently the figures given on total quantities used in 1928 and 1911 are not comparable, nor are the totals by kinds of wood. In a general discussion under Part II, The Woods Used, it is stated that "482,750,000 feet were consumed by a group of industries similar to those which reported nearly twice as much in the earlier survey." (The total quantity consumed in 1928 is given as 732,546,857 feet; the corresponding figure given in the 1911 report was 894,441,902 feet.) Evidently the figure of 482,750,000 feet was arrived at by deducting only the quantities of wood used in 1928 in manufacturing tanning extract, pulp, and cooperage stock. It is not explained why the quantity used in manufacturing veneer was not also deducted. It seems not only that this item should have been deducted to make a valid comparison with 1911 but that it should have been omitted from the total given in this bulletin; it may be inferred from the text that much of this veneer must have entered into furniture and other products manufactured in the State and therefore have been added into the total twice.

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[4] Wahlenberg, W. G. Investigations in Weed Control by Zinc Sulphate and other Chemicals at the Savenac Nursery. U. S. Department of Agriculture Technical Bulletin 156. 36 pp. 1930.

Figures on lumber used in manufacture in 1928 have recently been compiled by the United States Forest Service as a part of the national survey of forest resources and wood requirements. Primary industries included in the Virginia report but not in the Forest Service compilation for 1928 are reported by the former to have consumed 285,194,696 board feet in that year. Deducting this quantity from the total quantity consumed in the State during the year as quoted by the Virginia bulletin leaves a balance of 447,352,161 board feet as compared with the Forest Service total of 477,797,000 board feet, a difference of approximately 6 per cent.

The most striking differences between quantities reported by the Forest Service in 1911 and quantities reported by the Virginia Polytechnic Institute in 1928 are as follows: Boxes and shooks declined about 60 per cent and planing-mill products about 75 per cent, while furniture increased about 400 per cent. Competition from fiber containers and other substitutes is suggested as a reason for the decrease in boxes, and the "tendency for wood fabricators to keep near lumber-producing centers" as the reason for decrease in planing-mill products.

A great decrease is shown for "yellow pine" and large increases for chestnut, red gum, and tupelo. Valid comparisons by kinds of wood can not be made from the summary table, however, because of the inclusion in the 1928 report of primary industries not included in that of 1911. "White pine" and "yellow pine" include western as well as eastern species, so that no opportunity is provided of determining to what extent the former are replacing the latter.

The average cost of all material at the factory was reported as $29.93 per 1,000 board feet in 1928 as compared to $15 reported for 1911.

On page 70, under a general discussion of industries, reference is made to a "200 per cent decrease in the lumber consumption," and on page 30 it is stated that "the amount used decreased nearly 100 per cent." The author doubtless intended to indicate that the decreases amounted to 200 per cent and 100 per cent, respectively, of the quantities used during the later period.

This general survey of the wood-using industries of Virginia should be of considerable value not only to the industries themselves, in helping them to improve their manufacturing practices, but also to timber owners who wish to market their products advantageously. It should stimulate local interest in the proper use of timber and also in its growth. The data have evidently been collected with care and are well presented in tabular form. The large number of appropriate illustrations and diagrams, as well as the selection of good type and high-quality paper, adds much to the attractiveness of the publication.

Marketing Woodland Products in Virginia

By W. D. Brush, United States Forest Service

The small timber owner, especially if he is a farmer with his main interest in other crops, needs all the available information bearing on profitable outlets for his timber. State wood-using industry reports, such as the Virginia report discussed in the foregoing review, may help him to locate markets; but usually he requires more detailed information on such subjects as how to determine the value of the timber, how to prepare it for sale, and what are likely to be the most profitable markets. Such information is very admirably presented in the 69-page publication Marketing Woodland Products in Virginia, by J. Elton Lodewick, published by the Virginia Agricultural Experiment Station and the Virginia Polytechnic Institute.

Professor Lodewick first discusses the advantages and disadvantages of different methods of selling, describes the place of the sawmill in marketing, and gives an account of cooperative marketing procedure. Methods of determining the value of timber by estimating and scaling are briefly described.

The main portion of the bulletin consists in detailed information on each form of forest product, as logs, poles, posts, lumber, and mine timbers, that will be helpful in marketing timber in these forms in Virginia. Specifications, stumpage prices, harvesting and transportation costs, commissions, selling prices (and price trends), and lists of users are given under each of these products.

Some of the information in this bulletin, the preface states, has been adapted from other publications;

ofessor Lodewick has, however, furnished a large antity of new data that should be of inestimable lue to the Virginia timber owner who wishes to nvert his trees into money.

Even under the present unfavorable market condi- ons for forest products, this publication is of service helping the owner to think of his woodland in terms markets and to avoid disposing of his wood crop for ss than the real value.

Fertilizer Experiments at Savenac Nursery

By L. S. Gross, United States Forest Service

W. G. Wahlenberg presents in United States Depart- ent of Agriculture Circular No. 125[5] the results of veral years' experimentation at Savenac Nursery, augan, Mont., in the use of fertilizer in producing rest planting stock. Experiments carried out in the eriod 1921 to 1926 were aimed at determining an fective and safe method of stimulating development the slow-growing Engelmann spruce. Work begun 1925 had as its object the maintenance of the roductivity of nursery soil. Forest nursery soil is, of ourse, subject to a greater drain than the soil on which ost agricultural crops are produced, since the seed- ngs are commonly grown at densities of 100 or more o the square foot and are lifted entire together with he soil surrounding their roots.

The experiments in maintaining soil fertility were tarted in 1925, when intensive cropping had been racticed at Savenac Nursery for 15 years. A triangle ertilizer experiment was initiated with the establish- ent of 21 separate plots of 3 square feet each. Half f each plot was sown to western yellow pine and half o Engelmann spruce, uniform quantities of seed of he same lot being used on all plots of each species and reatment of all plots being identical during the year xcept for the application of fertilizer. The three plots t the corners of the triangle were fertilized with odium nitrate (nitrogen), muriate of potash (potas- ium), and superphosphate (phosphorus), respectively. The four outside plots between each two corners were ertilized with mixtures of the two elements represented by the corner plots, the proportion of each element in he mixture varying with the distance of the plot from he corner. The six interior plots were treated with ifferent mixtures of the three fertilizers used. Two unfertilized check plots were established near the triangle.

Engelmann spruce seedlings grown in the nursery in soil fertilized with dried blood and ground bone showed stimulation of growth as early as the second year. At the end of the third year, those heavily fertilized weighed more than twice as much as seedlings grown without fertilizer weighed when 4 years old. Stock grown in fertilized soil and transplanted to the field as 3–0 seedlings survived field planting in a greater proportion than stock of the same age class grown in unfertilized soil. Seedlings grown on fertilized soil that were heavily watered developed faster than others but showed a tendency toward an unbalanced, top-heavy form. Heavy seed-bed watering had little effect on the height of 2–2 stock and no significant effect on the field survival of 3–0 stock. Results of a few tests indicated that sodium nitrate in solution might advantageously be used as a top dressing for 2–0 Engelmann spruce beds, in the proportion of one-half pound or one pound to 48 square feet. This treatment tends to eliminate weaker and crowded individuals and to force the growth of the better trees.

Best results with western yellow pine were obtained in the portion of the triangle nearest the nitrogen corner. The plot selected as showing the best all-round development of suitable planting stock was that fertilized with a mixture of sodium nitrate, superphosphate, and muriate of potash in the proportions of 320 pounds, 160 pounds, and 30 pounds, respectively, per acre. With an average rating of 100 assigned to the check plots on the basis of germination percentage, percentage of good stock produced, height of top, diameter of stem, oven-dry weight, relation of weight of root to weight of top, total root surface, and root surface at a depth of 4 to 8 inches (the depth indicated by field observations in the region served by Savenac Nursery as that at which it is most desirable to have the greatest concentration of root surface), the fertilized plots of western yellow pine received ratings ranging from 97 to 131.4. For Engelmann spruce no significant results were obtained in this experiment.

In order to determine the best source of the elements shown by the triangle experiment to give best results with western yellow pine, tests were made with 30 common fertilizers or mixtures of fertilizers. The four that gave the best results, with the quantities used per acre, are as follows: A commercial mixture of superphosphate, bone meal, tankage, and guano, 4,322 pounds; blood and bone, mixed in the ratio of 2 to 1, 2,722 pounds; ammonium sulphate, 621 pounds; and dried blood, 908 pounds.

The circular is well illustrated. The portion dealing with maintenance of nursery soil fertility presents particularly valuable figures indicating average root development.

The methods used in conducting the experiments and in evaluating the results are of great value and should be applicable to most forest nurseries. Most of the conclusions arrived at may be of value elsewhere; in applying these results to other nurseries, however, it must be kept constantly in mind that because of wide variation in conditions each nursery represents an individual problem. Costs of purchasing and applying fertilizers, also, were not considered in the Savenac experiments. It is entirely possible that the practical nurseryman, considering values obtained per dollar invested, may prefer some fertilizer other than those which were considered to give best results in these tests.

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[5] Experiments in the Use of Fertilizers in Growing Forest Planting Material at the Savenac Nursery. Copies may be obtained free of charge, s long as the supply lasts, from the Office of Information, U. S. Department of Agriculture, Washington, D. C.

Influence of Felling Season on Quality of Wood

By B. J. Rendle, British Forest Products Laboratory

(From Forestry, the Journal of the Society of Foresters of Great Britain, December, 1930)

For centuries it has been the general practice in Europe to fell timber when the sap is "down." The custom, like so many traditional operations of a similar kind, probably owes something both to experience and expediency; for, although there is a widespread prejudice among wood users in favor of winter-felled timber, there are several independent but potent considerations which combine to make it more convenient for the forester to carry out felling operations in the winter. Previous research has failed to discover any inherent difference between wood from trees felled at different seasons, but has shown that the quality may be materially affected by the conditions to which the timber is exposed after felling. Chief among these is the greater liability of spring and summer felled timber to be attacked by wood-destroying insects and fungi. This report[6] deals with the first part of an investigation into the influence of the felling season on the technical properties of Norway spruce and silver fir. Between September, 1926, and August, 1927, selected trees in a 120-year-old stand of spruce, silver fir, and beech were felled at monthly intervals. In order to eliminate the variable effect of the sun, the timber was felled in the early morning and piled under cover. Mechanical tests were carried out on specimens in the green and air-dry conditions and various other physical properties were investigated.

To summarize the results. It was found that the time of felling exercised no substantial influence on the specific gravity, moisture content, shrinkage, resin content, or working qualities. Important differences were observed in the rate of drying; samples from trees felled between October and January dried extraordinarily slowly and evenly, taking six to eight months to reach the air-dry condition, while samples taken between May and July attained the same condition in one to two months. It is especially noteworthy that the slow drying rate of the winter-felled samples was maintained through the summer months, so that these samples were overtaken by others which were felled later in the same year. The results of the tests on mechanical strength are not included in the report but will be publishe elsewhere.

In a series of carefully controlled experiments of th kind it is inevitable that the attempt to eliminate a factors but the one under examination results in th experimental conditions being widely different from those which prevail in actual practice. Taking it fo granted that the preference for winter-felled timbe rests on a real difference in quality, the fact that, unde the conditions of the experiment, the felling seaso had no important effect on the technical propertie serves to concentrate attention on the conditions unde which extraction and conversion are usually conducted It is then seen that the real influence of the seasons i through the effect of the weather, in controlling th drying of the timber and the activity of insects an fungi. Having regard to these conditions, it is con cluded that the most suitable season for felling i autumn and early winter (from September to the en of November). The earlier in the autumn the timbe is felled, the more likely it is to dry down graduall to a reasonably low moisture content and the les likely to be attacked in the spring by fungi and insects

It is generally admitted that in the past forestry ha been too much concerned with volume production an too little with the improvement of quality. In recen years signs have not been lacking of a change in atti tude and it is also realized that wide economies can b effected by intensive utilization methods. A repor such as this, which directs attention to the ways an means of minimizing the deterioration of timber afte felling, comes at an opportune time.

The results of tests on the durability of sample under ordinary conditions and after artificial infectio in the laboratory will form the subject of a secon report to be published at a later date. Judging from an account of this work which was given to the Fifth International Botanical Congress at Cambridge, these results are likely to prove the most important of the whole investigation.

Recent Publications of the Forest Service

Technical Bulletin 223–T, Reproduction on Pulpwood Lands in the Northeast, by Marinus Westveld.

Miscellaneous Publication 106–M, Pine Tree Treasures by Nina Owen.

Miscellaneous Publication 107–M, An Explanation o American Lumber Standards, by C. V. Sweet.

National Forest Administrative Maps: ½ inch, Trinity ¼ inch, Nezperce, Manti.

National Forest Proclamation Diagram, Nezperce.

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A complete list of the more formal publications of the United States Forest Service as of January 1, 1931, is available for distribution. Requests should be addressed to the Division of Silvics, United States Forest Service, Washington, D. C.

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[6] Knuchel, Herman: Untersuchungen über den Einfluss der Fällzeit auf die Eigenschaften des Fichten-und Tannenholzes. I. Der Einfluss der Fällzeit auf einige physikalische und gewerbliche Eigenschaften des Holzes. Beiheft zu den Zeitschriften des Schweizerischen Forstvereins. Buchdruckerei Büchler & Co. Bern, 1930.

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FOREST WORKER

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Announcements

Pacific Science Congress

The Fifth Pacific Science Congress is to be held at Victoria and Vancouver, British Columbia, May 23–June 4, 1932, under the auspices of the National Research Council of Canada. It is planned to have a half-day session on each of the six following subjects: Trade in forest products, meteorology and terrestrial magnetism and forestry; entomology and forestry; wood products and products research; silvicultural research; and pulp, paper, and cellulose. The general secretary of the congress is S. J. Cook, 79 Sussex Street, Ottawa, Ontario. The chairman of the sectional committee on forestry is P. Z. Caverhill, chief forester, British Columbia Department of Lands, Victori British Columbia.

New York and New England Foresters t Meet on Rogers Estate

The New York and New England sections of th Society of American Foresters will hold a joint meetin September 3 or 4 on the Rogers estate, at Hyde Par N. Y. This estate affords an example of the results 20 years' adherence to a forestry management pla such a plan having been prepared for it by the Unite States Forest Service in 1905 and followed out con sistently.

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FOREST WORKER

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State Forestry

New York Extends Application of Forest Tax Law and Enlarges Adirondack Park

A 1931 amendment to the Fisher forest tax law of ew York, which as passed in 1929 and amended in 930 provided for the relief of taxation on planted rests, extends the provisions of the law to forests aturally reproduced. This law provides that imature forest growth, occupying tracts at least 15 res in extent, such as will eventually develop merhantable timber crops may be exempted from taxaon, and that so long as the timber is thus exempted e assessed valuation of the land which it occupies an not be increased. It provides for a yield tax mounting to 6 per cent of the stumpage value of the mber.

An act signed by Governor Roosevelt March 18 exnds the Adirondack Park by 1,550,000 acres, making s total area 4,604,000 acres. Of the land thus added the park, 1,201,000 acres is privately owned and 49,000 acres is State owned. This act, Commissioner Morgenthau explains, brings into the park all the forest and in the Adirondacks that is desirable for forest reserve and park purposes. On all State-owned land ithin the Adirondack Park boundaries timber cutting perpetually forbidden.

The bill proposing a constitutional amendment that would provide for the appropriation of $19,000,000 over period of 11 years for establishing forest nurseries and or acquiring land and reforesting it was again approved y the legislature. This proposal will be submitted to opular vote in November, 1931.

The life of the reforestation investigative commission reated by the New York Legislature in 1928 has been xtended by one year.

Montana Authorizes Exchanges of State-Owned Forest Land

Exchange of State-owned forest lands for forest ands in Federal or private ownership is provided for y an act of the Montana Legislature approved March 6. Proposals for such exchanges are to be referred o the State forester for investigation. His findings re to be presented to the State board of land commissioners, which if it favors the exchange is to publish a notice reciting the general terms of the proposal and naming a date on which the board will hear any objections to the proposal pending final action upon it.

Another Montana act of 1931 makes it unlawful to operate a portable sawmill on forest land within the State without first obtaining a license from the State forester. Violation of this provision is made punishable by a fine of from $25 to $500.

Nevada Enters Cooperative Agreement for Forest Fire Protection

Nevada has entered into an agreement with the Federal Government under provisions of the Clarke-McNary law for cooperative protection of forest lands from fire. The agreement declares that protection is needed for 315,000 acres of forest land in the State, establishes 0.2 per cent as the maximum to which it is desired to restrict the proportion of forest land burned annually, and mentions $13,557 as the estimated cost of maintaining this standard. The first allotment of Federal funds for forest fire protection work in the State will be available for the year beginning July 1, 1931.

A special act of the Nevada Legislature was necessary as a prelude to the forming of this agreement.

Michigan Centralizes Responsibility for Conservation Work

The Michigan Conservation Department's field forces of law enforcement, forest-fire control, lands, and game refuges have been merged under one head, to be known as field administrator. Howard R. Sayre has been promoted to the new position, from that of chief fire warden. Mr. Sayre has had experience in the department's field activities as chief forester of the land economic survey and as assistant State forester. The scientific phases of the department's work are hereafter to be directed by P. S. Lovejoy. Mr. Lovejoy has had experience as a national forest supervisor, a member of the forestry faculty of the University of Michigan, and a magazine writer. More recently he has helped organize Michigan's land economic survey and reorganize its fire, land, and game divisions.

Indiana Has New State Forest Under Management

Acquisition work of the past two years has put the State of Indiana in possession of a consolidated forest tract of 10,000 acres in Morgan and Monroe Counties, 4 miles due south of Martinsville, which is being placed under management as the Morgan-Monroe Counties State Forest. Nine-tenths of the area is timberland; the remainder is old fields. Repeated burning has in the past caused much destruction of timber. Unusual timber-growing and recreational possibilities are seen in the area by State Forester Wilcox. Some excellent young second-growth timber is present, including poplar, walnut, ash, maple, and oak. The topography is very hilly. A fire lookout tower has been erected and manned, 556,000 forest trees and walnuts were planted this spring on about 500 acres of the old fields, and a beginning has been made in stocking the forest with pheasants and wild turkeys. An aerial photographic map has been prepared as a basis for management of the area.

Colorado Provides for Creating State Forest Through Land Exchange

Authority has been given to the Colorado State Board of Land Commissioners to exchange school, university, penitentiary, or any other State lands for Federal lands of equal area and appraised value, in order to consolidate an area of forest land that will constitute the Colorado State Forest. The board is made responsible for managing and protecting the forest. Anyone who through negligence is responsible for fires on the State forest or who removes timber from it without authority will be liable to a fine of not more than $300 or imprisonment in the county jail for not more than three months, or both such fine and imprisonment.

Pennsylvania State Forests Enlarged by 17,926 Acres

State forest land purchases closed by the Pennsylvania Department of Forests and Waters in April and May of this year aggregated 17,926 acres. Two tracts in Lycoming County were added to the Tiadaghton State Forest, one of 174 acres on the eastern shore of Pine Creek and one of 377 acres adjoining the public highway. An addition of 13,385 acres was made to the Tioga State Forest by purchase from the Central Pennsylvania Lumber Co. This land borders Pine Creek on the west and consolidates the department's holdings from Leetonia northward to West Pine Creek and the public road, and also adjoins the Stone purchase adjacent to the Leonard Harrison State Forest Park. It includes a tramroad grade on which has been constructed an improved State forest road paralleling Pine Creek. Two purchases totaling 3, acres were made on the Michaux State Forest.

Most of this land cost the State $3 per acre. other prices paid were $2.75 and $3.50 per acre.

Minnesota Law Provides for Forest Development of Tax-Delinquent Lan

By Ronald B. Craig, United States Forest Service

An act approved by Governor Olsen on April 1931, makes possible a new form of public forest main in Minnesota. The new law is entitled "An relating to and authorizing the creation, establi ment, and maintenance of State reforestation or flo control projects or other public State purposes, a providing * * * for their management and c trol; * * * providing for the acquisition by t State of unredeemed tax-delinquent lands ther and the use and disposition of such lands for su purposes * * *."

In brief, the law provides for acquisition by t State of tax-delinquent lands in any county in whi such lands on January 1, 1931, formed more than per cent of the total taxable lands of the county a "of which the bonded [drainage] ditch indebtedne * * * equals or exceeds 9 per cent of the assess valuation of the county." Such lands are to be a ministered by the department of conservation f "afforestation, reforestation, flood-control project or other public State purposes." The department authorized to make and enforce all necessary regul tions for the care and development of the lands a for "experimenting in and practically advancing forestry, flood control, and "other public State pu poses," which may include wild-life conservation an management and forest recreation.

The projects thus provided for are to be finance by the issuing of county certificates of indebtedne and with revenue derived from the use and manage ment of lands acquired under the act (as from timbe sales, licenses, and camping and special-use permits The department of conservation is authorized, als to accept gifts and bequests for use in connection wit these projects. The total issue of county certificate of indebtedness for the purpose of this act is limite to $1,500,000.

The balancing of State and county budgets an indebtedness on such projects and the redemption o tax certificates and county bonds are provided for b a rather involved process.

The act vests the department of conservation wit the right of eminent domain and authorizes it to acquir thereby, or by purchase, "any lands or interests i lands in any such project which said department shall deem necessary for State ownership, use, or development for the purposes of this act," subject to certain financial limitations relative to county indebtedness.

The act makes it a misdemeanor willfully to violate any of the rules and regulations promulgated by the partment of conservation in connection with the ojects for which it provides.

Minnesota Conservation Service Reorganized

A Minnesota law approved April 17 creates a conser- tion commission of five members to be appointed by e governor, with the consent of the senate, and to rve without compensation other than actual expenses. eretofore the State department of conservation s been headed by a commission consisting of the mmissioner of forestry and fire prevention, the com- issioner of game and fish, and the commissioner of nds and timber. The commission is to employ as nservation commissioner a person having experience d special training in conservation work, whose term ll be six years and who may be removed at any time the commission for cause. The conservation com- issioner's powers and duties will cover those formerly signed by law to the commissioner of forestry and e prevention, the commissioner of game and fish, d the commissioner of drainage and waters. All wers of the State auditor relating to public lands, mber, waters, and minerals are transferred, like- se, to the commissioner of conservation.

As units within the department of conservation the t creates a division of forestry, a division of drainage d waters, a division of game and fish, and a division lands and minerals. Each of these divisions is to under the immediate charge of a director subject the general supervision and control of the conserva- on commissioner. The directors are to be appointed the commissioner to serve at his pleasure. The rector of forestry is intrusted with the administra- on of all State forests and other State lands acquired set apart for forestry purposes and with the sale of l timber on such lands or on other State lands.

* * *

A law adopted this year by the Idaho Legislature nd approved by the governor provides that land itable for the production of trees, or watershed nd, acquired by any county under a tax deed may e deeded to the Federal Government in exchange for umpage. Stumpage so acquired is to be sold, and he proceeds of sale are to be deposited in the county reasury.

* * *

A leading project of the Connecticut Forest and Park ssociation is its effort to bring into public ownership esirable woodland tracts bordering highways. Indi- idual subscriptions are being solicited by the associa- ion to build up a roadside woodland reservation fund. Jnless in very exceptional cases, tracts purchased hrough the use of this fund will be deeded by the asso- iation to the State or to towns or villages.

Bull Creek and Dyerville Redwood Forests to Become State Property

Negotiations recently completed by the California State Park Commission with the Pacific Lumber Co. have cleared the way for State acquisition of the Bull Creek and Dyerville redwood forests, and the Save-the-Redwoods League has received contributions and pledges covering half the purchase price. The other half will be available from State park bond funds. John D. Rockefeller, jr., gave $1,000,000 and pledged a second $1,000,000 to match other private gifts. Many organizations and individuals throughout the United States have contributed.

The area to be acquired is one of 10,000 acres. It includes the watersheds of Bull Creek, Decker Creek, and Cabin Creek, as well as the North and South Dyerville Flats. It will become a part of the Humboldt State Redwood Park, which with this addition will extend for more than 15 miles along the Redwood Highway north from Miranda (230 miles north of San Francisco) and will have a primary area approximately 4 miles square. At least 15 miles of river will be included, with varied recreational possibilities.

The Save-the-Redwoods League has been campaigning for the acquisition of these redwood forests for more than 10 years.

What Connecticut Bought with Its $100,000 Unemployment Relief Forestry Fund

Improvement work carried out this spring on Connecticut State forests on the basis of a special unemployment relief appropriation of $100,000 has left the forests in better condition for fire control than they ever were before, says State Forester Hawes. More than 250 miles of firebreaks were cleaned out to a width of 15 feet, with all deadwood removed to a distance of 50 feet along each side. There are now very few areas of more than 500 acres on the State forests that are not cut by such fire lines; on some of the forests, including Paugnut, Nepaug, Mattatuck, and Nehantic, the areas uncut by firebreaks do not exceed 100 acres.

Work under the relief program included thinning 875 acres of timber and planting approximately 600,000 trees, mostly pine and spruce, on State forest land. The largest plantations were made on the Pachaug Forest area that was burned by a disastrous fire of May, 1930. Trained fire crews made available through the unemployment appropriation were helpful in holding the average area burned per fire in the spring season to 19 acres.

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An act of the Illinois Legislature approved this year gives consent to Federal acquisition of lands in Illinois for national forests.

Indiana Fire-Protection Program

By R. F. Wilcox, State Forester of Indiana

Part of the funds brought into the Indiana State treasury through a 2-mill levy for forestry purposes will be available for forest fire protection under a tax law amendment adopted by the legislature in 1931. Heretofore the proceeds of this levy, which brings in $100,000 a year, have been available for State forest acquisition and distribution of nursery planting stock only.

Adoption of this amendment followed consideration by the assembly of the results of a fire survey carried out by the Indiana Division of Forestry in 1930. A field survey made in six representative counties indicated that at least 237 spring and summer fires occurred in the State during that year and burned a total of more than 133,000 acres. A similar survey carried out after the fall fire season indicated that 300 fires occurred in the State during that season, covering 175,000 acres. These figures include burning on private classified reserves, second-growth hardwood lands, abandoned fields reverting to forest growth, and swamp lands in northern Indiana along the Kankakee River.

At present the State has four fire towers, located on forests, parks, and game preserves, which have served as nuclei for systematic fire protection of State-owned land and contiguous private forests. Before the fall fire season of 1931 begins three new fire-protection districts will be developed in southern Indiana, including approximately 500,000 acres of privately owned land.

Under the plan of organized protection for the purpose of which forest owners are being organized into county fire protective associations, the State furnishes a tower and telephone lines and places a fire lookout on duty during dry seasons on each association area. Nonresident members of the association pay 1 cent per year for each acre of their land that is to be protected, and this money is used to buy rakes, axes, and other tools for the use of fire-fighting crews organized by the resident members of the association.

In Brown County, where the first protective association was formed this year, only two forest fires were reported in the spring fire season, whereas the fire lookout observed as many as 12 fires burning at one time in adjoining counties that were not organized for fire protection.

A recent survey of forests, swamp land, and waste land reverting to forests in Indiana indicated that about 3,000,000 acres of land in the State is in immediate need of systematic fire protection.

Since Indiana has an excellent program of State forest acquisition, a successful tax exemption law for private lands undergoing reforestation, an adequate forest nursery, and a definite forest research program, provision for forest fire protection on a satisfactory basis gives the State a well-rounded forestry rec struction policy.

North Carolina Forest Fire Protecti System Covers 10,000,000 Acres

From a very small beginning some 10 years North Carolina's cooperative forest fire protect system has grown to cover more than 10,000,000 ac of the State's 21,000,000 acres of forest land. Co ties cooperating with the State in this work number Thirteen landowners' associations give special p tection to 350,000 acres. The protection syst divides the State into eight districts, of which six under the charge of technically trained district foreste Fire-control efforts thus far are confined to the mou tain and coastal plain regions, which include the larg areas of forest land and present the greatest fire ris

Fire-protection appropriations of the count cooperating in this work range from $400 to $2,000 year. Yearly assessments of members in protecti associations range from 1 cent to 5 cents per acre land listed.

Fire Emergency Committee at Work California

On May 19 James Rolph, jr., Governor of Californi issued a proclamation calling attention to droug conditions in the State and to the resultant fire dang and asking all agencies, public and private, to assist protecting forests and range land. A special fi emergency committee was appointed, consisting the heads of the principal State departments and members of the State board of forestry. Charles Howard, of San Francisco, chairman of the board forestry, is general chairman, and State Forester M B. Pratt is executive secretary.

Many of the field divisions in the various Sta departments have been organized to assist in fi prevention and suppression. Among these are t divisions of highways, fish and game, highway patro and plant quarantine, and the National Guar Cooperating agencies include the State chamber commerce, the American Legion, automobile club service clubs, conservation and protective association fire insurance companies, and the United States Fore Service.

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Seven thousand acres of land in the towns East Hartford, Glastonbury, Marlborough, Hebro Andover, Manchester, Vernon, and Bolton, Conn., hav been placed under protection by the Black Ledg Forest Protective Association, organized May 7. Thi is the seventh such organization formed in Connecticu and is the first formed in the portion of the State eas of the Connecticut River.

hode Island Legislates for Forest Protection and State Forest Acquisition

A Rhode Island law of 1931 authorizes the governor declare a forest-fire emergency when in his opinion unusual forest-fire hazard exists. While such a claration is in force the commissioner of agriculture is have full charge of forest fire protection activities, th power to appoint and employ as many as three strict forest wardens. Another act removes the limit eviously established by law on the amount that may expended annually for State forestry activities. nder a third act the throwing of lighted material, such tobacco or matches, on forest land, a private or public ad, or a railroad right of way is punishable by a fine of t more than $50. For the first time the Rhode and Legislature passed an act requiring the installan of spark arresters on steam shovels, sawmills, and rtain other devices, not including railway locomotives.

By another measure authority is given to the State mmissioner of agriculture, with the approval of the vernor, to accept gifts of property for general forest monstration and experimentation purposes. Prosion is made also for accepting gifts of money or curities to be used in promoting the practice of restry on lands thus acquired.

For the old tree warden law has been substituted a w act amplifying the authority of town and city tree ardens and removing the limitation previously established as to the amounts that each town or city may ppropriate annually for the use of tree wardens. This t authorizes tree wardens, the State board of public ads, the metropolitan park commission, or the park mmission of any town or city to cause the removal om grounds under their jurisdiction of any trees or her plants that are obnoxious as hosts of insects or ngous pests.

ew Delaware Forestry Law Deals with Taxation, Acquisition, and Protection

A measure adopted by the Delaware Legislature at s 1931 session and approved by the governor proides for exempting immature forests from taxation nd empowers the State forestry department to acuire land for State forests and parks and to appoint nd supervise forest fire wardens.

The tax-exemption provision applies to tracts of not ss than 5 acres of privately owned land well stocked ith trees, either through planting or through natural eproduction, conditions on which are such that the evelopment of a stand of merchantable timber is easonably assured. Land carrying any stand of trees nore than 5 feet in height, other than seed trees, is xcluded from classification. The exemption period 30 years.

Land for State forest or State park purposes may be cquired by purchase or gift or otherwise, and may later be sold, exchanged, or leased if the forestry department finds this to be to the advantage of State forest interests.

The State forester may appoint forest fire wardens to serve either voluntarily or under compensation, and game wardens and State police officers are made forest fire wardens ex officio. Fire wardens are empowered to obtain help in suppressing fires by employing assistants or, when necessary, by compulsion.

Willfully causing fire on forest or other land is made punishable by a fine of from $200 to $5,000 or imprisonment for not more than two years, or both fine and imprisonment. Causing fire through carelessness is made punishable by a fine of from $10 to $100. Refusing or neglecting to respond to a forest fire warden's summons or obstructing the work of a warden or warden's assistant is made punishable by a fine of from $10 to $100 or imprisonment for not more than 30 days. In addition to the penalties named anyone causing a forest fire is liable to the State for all expenses incurred in fighting and suppressing the fire.

Airplane Service for Forest Protection in California

Through the cooperation of the National Guard of California the State division of forestry has several Douglas planes at its disposal for the 1931 fire season. The planes are stationed at Mather Field, a few miles from the State capitol at Sacramento. They are used chiefly for scouting large fires and for quick transportation of experienced fire fighters. The pilots and mechanics are regular members of the National Guard, assigned to this duty during the period of the emergency.

Three other planes are being operated for forest protection in California by commercial concerns under contract with the United States Forest Service. Commercial air transport companies, also, are reporting by radio all fires observed by their employees during flights.

* * *

For Texas State forestry activities in the biennium beginning July 1, 1931, an appropriation of $129,710 has been made available. This is a slightly larger amount than was available for the purpose in the preceding biennium, aside from the $25,000 previously appropriated for the purchase of a virgin longleaf pine area on condition that a like sum be raised for this purpose by private subscription.

* * *

New Hampshire has made it an offense punishable by a fine of as much as $25 to throw or drop lighted material, such as a match or cigarette, from any vehicle on a public highway or private way or from any steam, gas, or electric car where the right of way is adjacent to woodlands.

Forest-Tree Planting and Distribution by States Amplified in 1930

Official reports to the United States Forest Service covering the numbers of trees that were planted by State forestry organizations or distributed by them for planting in 1930 indicate an increase of nearly 11,700,000 over the numbers of trees so planted and distributed in the preceding year. In 1929 the numbers reported by 36 States and Porto Rico and Hawaii totaled 67,722,001; the 1930 total was 79,319,629. Reports of planting or distribution of forest trees in 1930 came from four States that had not reported any such activities for 1929—South Carolina, Mississippi, Texas, and Utah. Missouri, having reported some distribution for 1929, reported none for 1930.

In 1930 the forest trees provided by the States, in cooperation with the Federal Government, for planting on farms numbered 25,836,215, or 593,518 more than in 1929; trees planted on State land reached a total of 30,443,654, which exceeds the total so used in 1929 by 6,479,240; and trees distributed by States for planting elsewhere than on farms or State-owned land totaled 23,039,760, an increase of 4,524,870.

As in preceding years, New York used and distributed a greater quantity of forest planting stock than any other State, its 1930 total of 24,960,700 trees falling short of its 1929 mark by some 400,000 only. Michigan, in second place, added 8,497,454 to its 1929 total, with a distribution of 19,384,259. Following Pennsylvania's 9,511,435, the next largest totals for 1930 were as follows: Massachusetts, 3,860,215; Ohio, 2,643,392; Wisconsin, 2,395,000; Connecticut, 1,904,600; Vermont, 1,825,700; Porto Rico, 1,773,900; New Jersey, 1,417,200; Louisiana, 1,197,853; New Hampshire, 981,022; and Hawaii, 914,800.

Forest nursery expenditures by the States during 1930 totaled $652,936. This includes a Federal contribution of $73,272.

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Legislative authority has been given in Minnesota for establishing and operating State nurseries for the production of forest trees to be planted on State-owned land. None of the stock is to be sold or given away. An appropriation of $6,000 per year has been made available for the biennium beginning July 1, 1931.

* * *

New York increased its blister rust control forces this spring to 200 men. One task of these men is to clear and maintain a protective zone around each of the State's five forest-tree nurseries. Within a belt 1,500 feet wide around each of the nurseries all plants of the currant-gooseberry family are being destroyed, and cultivated black currants are being destroyed to a distance of 1 mile from each nursery. Similar protection is being given to areas newly planted in the State's reforestation program.

Indiana Distribution of Walnuts fo Planting

The Indiana Division of Forestry reports that bushels of walnuts were distributed for planting spring under a plan in which it had the coopera of Frank S. Betz, of Hammond, Ind. The nuts v estimated to average about 1,000 to the bushel. Betz offered to give a bushel of walnuts to any sch club, or other organization that purchased a bu from the State. Both the nuts sold by the State those given away by Mr. Betz had been stratifiec preparation for planting.

Many of the nuts were planted by school child on Arbor Day. The Marion County Fish and Ga Association distributed 20,000 of them to si seventh, and eighth grade children in about 40 to ship schools. Other agencies distributing large qu tities were the Northern States Life Insurance the Hammond National Bank, the American Ma Products Co., the Lever Bros. Soap Co., and Hammond Park Board.

* * *

Game officials of the Michigan Conservation Depa ment succeeded this year in their first attempt to reli congestion at a deer-yarding area by trapping t surplus and transferring them to other areas. At small winter yard in Fletcher Swamp, on the north ed of the Turtle Lake district, where supplies of food deer had been gradually diminished by lumbering op ations and by browsing, 100 deer were trapped a tagged. Of these, 96 were removed to other locatio by sleigh and truck and liberated. With the new designed trap used the catch averaged one deer p trap every two days.

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Plans are being developed by the Wisconsin Conse vation Commission under which private landowne carrying out measures calculated to encourage gan restoration would be remunerated by the State. T commission has recommended that several methods compensation be tried out, including the leasing farms by sportsmen's groups, payment per head game shot, and payment for hunting privileges by t day.

* * *

William Mauthe, chairman of the Wisconsin Co servation Commission, has placed before a legislativ committee a proposal that prison labor be made avai able for State forest protection and improvemen projects. Because of lack of funds the commissio foresees that fundamental projects for State fores restoration can not be carried out for many year unless some such arrangement is made.

Education and Extension

Forestry Instruction Offered by Southern Branch of University of Idaho

Inauguration of instruction in forestry, logging engineering, and range management in the Southern Branch of the University of Idaho, at Pocatello, is announced by Executive Dean John Dyer. A 2-year course in forestry will be offered. With this addition to its curriculum the branch institution, which had an enrollment of 700 during the school year 1930–31, will be offering the first two years of a course in each of the standard professions. A full 4-year course in pharmacy is offered. The forestry professorship has been accepted by Charles M. Genaux, who for the past two years has been teaching forestry in the Utah State Agricultural College. Professor Genaux is a graduate of the Pennsylvania State College of Forestry and received the master's degree in forestry from the University of Idaho. He will enter upon his new duties September 1, 1931.

Idaho University Experimenting with Blister Rust Parasite

Experiments with *Tuberculina maxima*, a fungus known to German pathologists as an enemy of the white pine blister rust, have been undertaken by E. E. Hubert, of the University of Idaho. Spore material of the fungus has been obtained from Karl von Tubeuf, forest pathologist, of Munich. Doctor Hubert has inoculated several western white pine trees in the Elk River district and intends to make laboratory tests to determine whether the fungus will function normally under the climatic conditions of Idaho.

This parasite on the white pine blister rust is described as growing each year several crops of microscopic spores which are distributed by wind over distances of several miles.

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Best results in growing evergreen magnolia (*Magnolia grandiflora* L.) from seed are obtained by planting the seed in the fall immediately after collecting it, according to the results of tests made at the University of Louisiana by G. D. Marckworth, now professor of forestry in the University of Georgia. Removal of the fleshy coat from the seed either by hand or by the use of chemicals (caustic soda, petroleum ether, and chloroform) had no perceptible effect on germination. Experiments in which seed were stratified in sand did not yield definite indications as to the efficacy of this treatment.

St. Lawrence University Establishes Second Demonstration Forest

A second demonstration forest has been established by the forestry department of St. Lawrence University, Canton, N. Y. The tract chosen for the purpose is one of 50 acres located on the Lake Road, 2 miles west of Sandy Creek, in Oswego County. A plantation of northern white pine and Norway spruce established eight or more years ago occupied 12 or 15 acres of the land at the time when it was purchased by the university. Under the direction of W. J. Endersbee, the forestry department's representative for the counties of Oswego, Jefferson, and Lewis, 30,000 trees were planted on the tract this spring. Half the trees were furnished by the New York State College of Forestry. Approximately 10 acres remain to be planted.

The trees planted this year are Norway and white spruce, northern white pine, Norway pine, Scotch pine, northern white cedar, Carolina poplar, and black locust. Roadways have been left between the various plots for the convenience of visitors.

Oak-Hickory Woods Study at Purdue

A study of oak-hickory woods, designed primarily to determine the cattle-carrying capacity of the woods, is being made by the Purdue Agricultural Experiment Station and the Central States Forest Experiment Station. Eighteen plots about 20 feet square, on which a record of vegetation will be kept, have been established on the Pinney Purdue farm. Half these plots are subject to grazing and half are fenced. To determine the change in plant succession resulting from grazing, four meter-square quadrats have been established within each of the fenced and unfenced plots, on which about three counts will be made during each grazing season. Stanley A. Cain, of Butler University, Indianapolis, has charge of this phase of the study.

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In appropriating $475,000 for the continuation of three series of postdoctorate fellowships administered by the National Research Council the Rockefeller Foundation has provided $90,000 for fellowships abroad in the biological sciences and special fellowships in forestry and agriculture. For each of the academic years 1932–33 and 1933–34 the board provides $20,000 for the former and $25,000 for the latter group of fellowships.

How Windbreaks Can Be Grown in Nebraska

A plan by which ranchers in the neighborhood of Hyannis, Nebr., are successfully growing windbreaks by proxy is described in a letter to Extension Forester C. W. Watkins from Victor Bal, of Hyannis, as follows:

Since last year I don't plant anything else but western yellow pine. They are harder to get started than any other pines, but they are worth ten times more than any other pine for windbreaks in this territory.

About this time of year I sign a contract with the rancher to plant generally 500 bull pines [western yellow pines] next spring. I agree to furnish the trees, from 12 to 18 inches high, plant them, take care of them the whole summer, and cultivate and water them, and the rancher agrees that next fall, about the 1st of October, he will pay me $1 for each living tree. If any of the trees die during the summer it is my loss. I have had as many as 460 living out of 500 planted. If I get good trees I don't generally lose more than 10 per cent and sometimes lose less.

Early in the spring, in March, I go over the ground to be planted and put in every mouse or gopher hole some poisoned wheat. As this time of year the mice and gophers are coming out very hungry, they eat the wheat eagerly, and in this way I poison most of them and save many trees. Then in April, a few days before the trees arrive, I plow the ground, always from west to east and throwing the dirt to the south. In this way I get very good protection against the summer sun and winds. I plow two furrows for each row of trees, and plant each two rows 10 feet apart and trees 10 feet apart in rows, offset in every row. After the ground is plowed and the trees arrive I watch the weather, and as soon as the days are cloudy or rainy I start to plant them. I have one hired man to dig the holes for me and carry a few buckets of water. I put the tree in the hole, spread the roots, fill the hole half full with dirt, and then pour in about 1 quart of water. This is very important, as it will make the dirt stick to the roots. Then I fill the hole about three-fourths full of dirt and pack it solid. After that I put a little loose dirt on top to hold the moisture.

About a week after planting I do the first hoeing with a heavy garden hoe, hoeing about 1 foot around the tree and at the same time building a little pit or basin around the tree about 1 foot in diameter and about 4 inches deep to hold the rain. Right after this I put a couple of shingles around the tree, one on the south side and the other on the west side, as close together as possible and slanting a little over the tree. This is very good protection against hot sun and winds and also hail. Once the trees are planted and protected, all that is necessary is to hoe them, and sometimes to water them. I hoe them about once in May and once in June, and then once every two weeks in July, August, and September. I also hoe after every heavy rain, as the rain makes a crust on the ground which has to be hoed and pulverized to hold the moisture.

With care like this I don't lose very many trees except by hail. The trees look very healthy and get an early start, and when 5 years old they are 6 to 8 feet high. I have some trees, bull pines, which are 12 years old and over 25 feet high.

Some of the ranchers want me to take care of the trees the second year, as they are generally very busy haying in summer and can't very well take care of these trees. So we make a new contract by which I agree to take care of the trees the second summer for 20 cents per tree and guarantee them to grow. If any tree dies during the summer I agree to pay the rancl $1 for it. Of course, very few die the second summ I plant only 2,000 trees each year, as that is all one m can take proper care of during the summer.

Oklahoma Erosion Study and Terraci Experiment

An erosion study by the Oklahoma Agricultu Experiment Station, covering 48 of the 77 counties the State, revealed serious danger from both gullyi and sheet erosion. Land with rough topography w found to have suffered an erosion damage more seve than that noted on comparatively level land in t same rainfall belt. In the first five months of 193 during which the rainfall totaled 19.9 inches, a fie farmed in cotton without any winter cover crop lo 15.9 tons of soil per acre. The loss during the san period from a field of oats was only 3.9 tons per ac and the loss from a field of sweetclover was only 0.5 t per acre. At the Panhandle (Okla)., station, cr production on plots of terraced land showed a 5-ye average increase of 23.6 per cent in the period 192 1930. The terraced plots now in operation ha vertical intervals ranging from 3 inches to 12 inches land with an average slope of 0.7 per cent.

Planted Elm and Hackberry Successfu in Western South Dakota

Elm and hackberry planted in 1916 on the Vivia farm of the South Dakota Agricultural Experime Station have developed into an effective demonstratic of successful planting of trees for shelter in wester South Dakota. The farm is located at Vivian, 50 mil west of the Missouri River.

Together with the elm and hackberry, there we planted in 1916 some cottonwood and a hedge caragana. All the trees started successfully and mac notable growth for several years. In 1924, howeve it was found that all but one of the cottonwoods ha died during the previous winter. The elm and hackberry had by that time attained sufficient size to occup all the available tree space in the plantation. I July, 1930, the grove contained 40 elm and 40 hackberry trees, 16 feet apart in rows 15 feet apart. At th age of 14 years the trees were approximately 9 inche in diameter at the base and stood 20 feet high. The were thrifty in every respect. The caragana wer similarly thrifty.

The trees in the Vivian farm grove are cultivated i such a manner that the soil is thrown into a ridge between the rows, causing moisture to drain toward th trees. A steel road drag proved unsatisfactory fo this purpose, because it was too long and so failed t throw the ridge in the center of the space betwee rows. The desired result has been obtained by the us of a drag constructed by Frank Hussey, farm foreman in which two 2 by 6 planks 6½ feet long are set nearl upright for blades.

Utah Farmers Show Increasing Interest in Forest Planting

The Utah State Agricultural College, in cooperation with the United States Department of Agriculture, distributed 15,800 forest trees to farmers this spring. Approximately two-thirds of the trees were hardwoods, which grow very successfully in the State. There is ample opportunity to produce in Utah farm woodlands all the hardwood timber that will be required for use on the farms, says Extension Forester Charles M. Genaux. A growing appreciation of the need for more extensive tree planting on farms is reported by Mr. Genaux, who writes: "Wagon tongues, doubletrees, plowbeams, and numerous other wooden articles that are bought by farmers from the lumber yards are extremely high priced in this State. In many cases the freight on this material from the eastern points of manufacture is greater than the cost of the material itself. On top of this, most of the material received here is distinctly inferior in quality."

Chemical Treatment Stimulates Germination of Maple Seed and Acorns

Dormant seed of sugar maple and Norway maple and acorns of black oak and red oak were stimulated into germination by treatment with solutions of thiourea and ethylene chlorhydrin and by the vapors of ethylene chlorhydrin, in experiments reported by Carl G. Deuber, of the Osborn Botanical Laboratory, Yale University. With the maple seed, immersion in a 3 per cent solution of thiourea for one minute proved the most successful treatment. The solution was drained off the seed, the bottle stoppered, and the seed allowed to stand for a day before being planted. Immersing the seed in 3 and 6 per cent solutions of ethylene chlorhydrin (made by mixing 6 and 12 milliliters, respectively, of ethylene chlorhydrin, technical, with 194 and 188 milliliters of water) also was effective. When the seed had been immersed for a minute the solution was poured off. The seed then remained in the stoppered bottle for 24 hours before being planted.

With black-oak and red-oak acorns consistently good results were obtained by subjecting 50 to 100 acorns in a liter wide-mouth bottle to the vapors of 4 milliliters of ethylene chlorhydrin, technical, for 24 hours. The chemical was placed on a 5-inch square of cheesecloth suspended from the stopper. Acorns gathered in October and subjected to this treatment began to germinate within four weeks. Within 10 weeks, more than 70 per cent of the treated acorns had germinated, while the acorns not treated showed 1 per cent germination or none. Immersion of acorns in a 3 per cent solution of thiourea for 15 minutes was effective but took effect more slowly than the ethylene-chlorhydrin-vapor treatment. Germination in acorns treated with thiourea solution did not start until the seventh to tenth week after treatment.

In the tests on which this report is based more than 9,000 maple seed and 5,000 acorns were used.

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The University of California had 100 forestry students enrolled during the spring semester of 1931. There were 22 graduate students, 17 seniors, 26 juniors, 20 sophomores, and 15 freshmen. The preponderance of juniors is due to the number of men now coming from the junior colleges. Of the graduate students, 13 had received their bachelor's degrees from other institutions.

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Extension Forester D. E. Lauderburn, of Mississippi, is making it his practice to provide Mississippi farmers with information regarding prices and markets for farm timber. The information is obtained through correspondence with mills and wood-using plants. It is relayed to farmers through county agents and is also circulated by the Mississippi Agricultural Service Department. The mimeographed market report which Mr. Lauderburn distributed under the date April 20, 1931, contained information regarding 19 different timber species.

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Growth rings in a cypress tree recently cut in the Amite River Swamp, in lower Livingston Parish, La., indicated that the tree was 1,300 years old, reports Extension Forester Robert Moore. The tree had a merchantable length of 86 feet 8 inches, a stump diameter of 92 inches, and a volume of 16,175 board feet. It was sound throughout. The tree was the property of the Lyon Lumber Co., Grayville, La.

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A black locust tree recently cut by J. P. Munson, of Ithaca, N. Y., made more than 50 cents a year for its owner, reports J. A. Cope, New York State extension forester. The tree yielded 70 fence posts, each 6 feet 9 inches long. Valued at 25 cents each, the posts were worth $17.50. A count of annual growth rings in the fresh stump showed that the tree was 30 years old. Mr. Cope considers this tree exceptional, but adds that a plantation of black locust established on good soil for fence-post production promises to be a sound investment.

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Sixteen Eagle Scouts of New Hampshire were selected to take part this summer in opening the Valley Way Trail on the White Mountain National Forest, a section of one of the through routes to the summit of Mount Washington and to the northern peaks of the Presidential Range. It was planned to have the boys work one month, beginning July 6, the Forest Service providing tentage, tools, equipment, and food.

New Hampshire Four-H Club Members Plant Trees and Compete in Forestry Judging

During the last six years more than 3,000 New Hampshire boys and girls have planted a total of 1,500,000 forest trees, writes Extension Forester K. E. Barraclough. If all these plantings could be brought together in one block they would compose a young forest of 1,500 acres. In the spring of 1931 Four-H club boys and girls of the State planted 360,500 trees, Smith-Hughes School students planted 38,850, and Boy Scouts raised the State's total for juvenile planters to 400,000. The planting stock used consisted of 3-year root-pruned seedlings and 4-year transplants obtained from the State forest nursery at Gerrish, N. H. The State forestry department provided trees to be planted on land of parents, relatives, or guardians, allowing 500 each to boys or girls between the ages of 9 and 15, inclusive, and 1,000 each to boys or girls aged 16 to 20, inclusive.

In most cases the trees were brought by truck from the nursery to a point in the center of the county where children congregated to receive trees and planting instructions.

Forestry judging contests for Four-H club members, designed to test knowledge of planting, weeding, pruning, and thinning, were scheduled for June and July in 10 counties of New Hampshire. Contestants were to decide what treatment should be given to each of 25 tagged trees. In the county semifinal contests 200 boys and girls took part. A team of three membe selected from each county will take part in a Sta contest to be held at Durham on August 10, duri Farmers' Week. The members of the winning tea are to receive gold medals given by the Society f Protection of New Hampshire Forests.

To the champion Four-H forestry club of New Ham shire W. R. Brown, of Berlin, N. H., will award a $ cash prize this year, as he did in 1930.

Connecticut Forestry Demonstration Contest

Connecticut boys and girls aged 10 to 18 were invit this spring to register in a forestry contest the resul of which will be decided after November 1. Contes ants were offered their choice of three projects-thinning sapling stands of trees, weeding plantation and planting trees. For each of the three operatio the minimum plot size specified was one-half acr Each contestant is required to submit a written repo describing the plot and its condition before and aft the work and giving an accurate account of time spen quantity of wood cut, etc. The first prize is the bron medal offered by the American Forestry Associatio carrying a representation of the General Sherman Tre Three second prizes of $5 each will be given by th Connecticut Forest and Park Association, and it hoped that county prizes may be awarded.

Connecticut sponsors of the contest include th State forestry department, the extension forester, an the Connecticut Forest and Park Association.

Forest Service Notes

North Dakota Reaches Out for a Forest

By C. G. Bates, United States Forest Service

That North Dakota may again have a national forest, and may have one embodying an extensive planting program similar to that of the Nebraska National Forest, seems probable. At any rate the Lake States Forest Experiment Station, working with a special appropriation, is going ahead to determine the possibilities. Five acres of pines and spruces were planted in the spring of 1931, in the hope of advancing by one year the time when a decision might be reached as to the suitability of the soil and climatic conditions for coniferous tree growth. At present the possibility of growing timber in North Dakota is indicated only by a few scattered trees within the sandy region. Plans are being laid to plant on a scale of about 100 acres per annum, testing many different species, different ages and grades of stock, etc., and making a careful study of the results to determine just how successful plantin on a larger scale might be.

A national-forest unit in the Bad Lands section c the State was abandoned in 1917.

As a matter of fact, planting appears to be mor favored naturally in North Dakota than in Nebraska The Dakota sand-hill region is much closer to natura forest conditions, with a partial cover of aspen, bur oak, elm, and many shrubby species; also, with ap proximately the same rainfall, it has an appreciabl lower evaporation rate than the Nebraska area lyin about 5° farther south. As in Nebraska, the occurrenc of a ground cover of kinnikinnik suggests strongly th suitability of the site to western yellow pine. Th nearness to the Lake States pineries suggests tha Norway pine has an almost equal chance. Strangel enough, even the heavily wooded Turtle Mountains, few miles north of the sand hills, are devoid of conifers Practically the only question hinges on the occurrence of alkali, which may be present in sufficient quantities to prove injurious to conifers. The depressions where his is likely to be most in evidence seem likely to favor white or western white spruce or some of the hardwoods.

The North Dakota lands that hold most promise for ree growth are the sand-dune areas. This fact is due to he greater availability of water in the sandy soils and he low rate of evaporation from such soils. Because of he low rate of precipitation in the region, soils that do not absorb moisture readily are definitely incapable of sustaining tree growth except under cultivation. Accordingly, the Forest Service will limit the projected experimental planting to an area composed almost entirely of dune lands. Such an area has been chosen n McHenry County, near Towner, in the central portion of the State. This county is almost entirely a sand area, a large part of it having been the bed of a lake in glacial times. While there is some good farm land and thousands of acres of low flat hay land where the sand has not been blown into dunes, the latter occur scatteringly over most of the county. In some sections sand dunes occupy tracts of several square miles each, which have no agricultural use other than very low-grade grazing.

Pending legislation that would permit purchase of North Dakota land for national-forest purposes, the Lake States Forest Experiment Station is conducting initial trials on land set aside by the State for the use of the North Dakota School of Forestry, and will build headquarters on a small tract to be given to the United States by the commissioners of McHenry County. The State school of forestry, of which F. E. Cobb is president, is actively cooperating with the Forest Service in this undertaking, and will grow the trees required for the experimental planting in its nursery at Bottineau.

The possibility of successful forest planting has attracted widespread public interest in North Dakota, especially among those having a knowledge of the agricultural limitations of the sand-hill areas. That a national-forest enterprise will greatly stimulate interest in tree planting on the farms of the State can hardly be questioned. Tree planting on farms has been going ahead steadily with the assistance of both the State forester and the Northern Great Plains Field Station at Mandan, which operates a separate nursery for the production of stock for windbreak planting. The Lake States station will in no way compete in this established activity, but will, during the next year or two, conduct an intensive study of the value of windbreaks.

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By recess action of the National Forest Reservation Commission the purchase of 16,558.3 acres of land in 21 national forest purchase units was approved June 1. All the cases involved are small, averaging about 100 acres. The costs approved average $3.18 per acre. These purchases affect landowners urgently in need of financial assistance.

Damages Awarded in Fire Trespass Case Cover Cost of Restoring Timber Stand

The value of young timber killed by fire is measured by the cost of restoring the burned area to the condition it was in prior to the fire, according to rulings by the United States District Court at Coeur d'Alene, Idaho, Judge Charles C. Cavanah, in the case of the United States *v.* Blackwell Lumber Co. Evidence was admitted both as to the cost of planting the area involved and as to the cost of protecting the area until a stand of like age with that destroyed is reproduced. The court held also that when Government property is in danger it is the duty of the Government to protect it and that national forest officers are not obliged to delay their attack on a forest fire pending action by owners of adjacent private land to extinguish the fire. The case arose in connection with the Charlie Creek fire, which spread from lands of the lumber company to the St. Joe National Forest, Idaho, in August, 1929. Damages of $9,308.60 were awarded to the Government to cover the cost of fighting the fire and the value of the tree growth destroyed by the fire.

The Charlie Creek fire started in logging slash along a Blackwell Lumber Co. logging railroad south of Emida, Idaho. It burned over approximately 2,284 acres, including more than 700 acres of the St. Joe National Forest. The Government area burned was occupied chiefly by western white pine reproduction averaging 38 years in age. About 300 fire fighters were employed in putting out the fire, which was not subdued for several days.

The Government charged general negligence of the Blackwell Co. in allowing fire to spread from its land to the national forest, special negligence in failing to pile and burn slash concurrently with the cutting of trees along its logging railroad and in failing to dispose of slash on horse trails and rollways concurrently with the cutting of timber at those places, and negligence in operating an oil-burning locomotive without a spark arrester. It also charged negligence in violating the provisions of the Idaho forest law of 1925 relative to slash disposal on logging-road rights of way.

Sawmill Waste in the Douglas Fir Region

Normal sawmill waste resulting from the manufacture of rough green lumber in the Douglas fir region during 1929 amounted to 619,065,157 cubic feet (solid measure), according to findings in a study made by A. H. Hodgson, of the Portland (Oreg.) office of the Forest Service. Of this total, 44 per cent was recovered and sold as by-products, 29 per cent was used by the sawmills themselves as fuel for the production of domestic power and live steam, and 27 per cent was destroyed in the refuse burners. The total sale value, f. o. b. sawmill, of all by-products made in the region in 1929 from normal sawmill waste and from sawmill waste in excess of normal amounted to $8,196,554.

Use of Power Pumps in Region Seven

By H. O. Stabler, United States Forest Service

In the Eastern National Forest Region our experience in the use of power pumps is much less extensive than that of our big brothers of the West. The region's annual crop of fires for the 5-year period 1926–1930 was 1,112, of which more than 90 per cent were of the surface type as distinguished from ground or crown fires. Our ground fires are in the spruce and northern hardwood types of the Monongahela and White Mountain Forests, in the hemlock stands on some of the Appalachian forests, and in the "bay" type on the forests in Florida. During periods of summer drought the swamp areas along the streams in the Florida forests dry out and become subject to fires that are very difficult to extinguish. In such locations, since water is ordinarily available, power pumps are of great value. Fortunately but few fires occur on the White Mountain Forest; the forest is now equipped with pumpers, however, and these are relied upon to control duff fires wherever water is available.

Power pumps were of real value in controlling bad fires that occurred during the summer of 1930 on the cut-over spruce area of the Monongahela Forest. In October of 1930 a fire in Black Water Canyon on the Monongahela Forest gave us some excellent experience in the use of pumpers. The fire started along Black Water River and eventually involved approximately 40 acres along the canyon side, the upper edge of the fire being at approximately 800 feet higher elevation than the point of origin. This fire, starting in the late afternoon, was attacked by 7 p. m. Soon thereafter a pumper installed at the river was being used effectively on the lower edges of the fire. It was attempted to relay water from the river pump up the slope to a second pump. This effort met with poor success, and it was not until the following afternoon that a pump was established in a lateral stream of Black Water River at the upper edge of the canyon, within less than a quarter of a mile of the eastern edge of the fire. At this location water had to be lifted by the pumper a bare 100 feet before it could be turned over the rim of the canyon at any portion of the fire area which the length of the hose made accessible. Sufficient hose was not available at first, but in the course of 24 hours approximately 3,000 feet was on hand and water was placed directly on nearly all of the east, south, and west lines. Furthermore, hose was taken to the interior of the fire and was used effectively in extinguishing fire in the duff amid rocks and bowlders and in keeping deadened rhododendron leaves from igniting. At no time during the life of this fire were burning conditions exceptionally good; but in spite of the fact that we had ample man power from the morning of the day following the start of the fire, it is problematic whether we could have controlled it and held it within the canyon without the use of pumps. If the fire had escaped to the surrounding plateau, part of which h been planted to spruce, it would have reached lar dimensions and plantations would have been destroy

We learned much from this Black Water Canyon fi which was in an ideal location for the use of pow pumps. Obviously the outstanding lesson broug home to local forest officers was the absolute necessi of knowing the location of the water supply in advan of the occurrence of a fire. Had a pump with 1,5 feet of hose been installed at the lateral stream duri the early hours of the night when the fire started, t fire could surely have been held to an area of 10 acr or less.

Our second outstanding lesson, which is no le obvious than the first, was that as a measure of pr paredness men must be trained in the use of pumpe A pump is a wonderfully efficient little piece of machi ery, but it requires a trained nurse who is expert in i operation.

Needless to say, the use of water is in no sense substitute for a properly placed and adequately co structed control line. The pumper is merely a ver efficient tool for holding a line already constructed, ar in some instances for cooling down the fire so as to pe mit line construction. This I consider a very impo tant point; all too often the tendency will be to re too much on pumps and water and to pass up oppo tunities to stop the spread of fire by constructing a lin

Graphic Charts for Lookouts Are Part c California Research Plan

In connection with its forest-fire studies, which cer ter on the Shasta National Forest, Calif., the Californi Forest Experiment Station has provided several look out stations on the Shasta Forest with graphic chart designed to assist the lookout men in systematic obse vation of their territory. The use of these charts expected to contribute to better detection of fires an will result in the collection of data from which the ex periment station hopes to learn something about vis bility conditions.

Each chart was made on the scale of one-half inch t the mile, which allows an atlas-size sheet to represen an area of 20-mile radius. Concentric circles wer drawn with radii representing distances of 5 miles, 1 miles, 15 miles, and 20 miles from the lookout statior North-south and east-west lines were drawn througl the center of the chart. Next a series of natural fea tures were indicated as observation targets, at varyin distances from the lookout and at intervals through eacl quadrant. Typical targets are a forked tree, a brusl patch, a large rock in brush, a ridge intersection. Car was taken not to select highly conspicuous features it is desirable that the observer be obliged to scan th landscape with some care to pick out his targets. Th distances were staggered so that as the eye passes fron one target to another it is compelled to change focus hich enhances the probability of picking up smokes at termediate points.

The location of each target was plotted on the chart t the proper azimuth as determined by an alidade eading and at the proper distance from the lookout oint as determined by reference to known topographic r cultural features. A small sketch of each target as made on the chart, and a description of the target as printed at one side of the sketch. A line tipped ith an arrow was drawn from each target sketch oward the center until it intersected the next distance ircle, and along this line the correct azimuth reading as printed in blue ink. The sketches of the targets ere numbered in red, in clockwise sequence, for onvenience in recording visibility.

Eight targets were chosen in each quadrant, or 32 n all, unless vision from the station was restricted in ome direction.

Lookout men using these charts make and record bservations every 15 minutes. Visibility conditions re recorded under three heads—plainly seen, dimly een, and not seen, indicated by P, D, and X, respec-ively. In a test the time required for this systematic bservation and recording was about seven minutes. amiliarity gained by practice is expected to reduce he time requirement to five minutes.

Northern Rocky Mountain Experiment Station Enlarged

Plans have been approved for concentrating in the Federal forest experiment station at Missoula, Mont., responsibility for all the organized research work of the Forest Service in the Northern Region. This work includes the silvicultural research which the experiment station has carried on under the directorship of R. H. Weidman and the forest products investigations directed by M. I. Bradner, of the regional office. To these are to be added forest survey and range investigative activities for which Congress recently made appropriations. The enlarged station will be headed by L. F. Watts, now in charge of the silvicultural work of the Intermountain Forest and Range Experiment Station, at Ogden, Utah. It will be known as the Northern Rocky Mountain Forest and Range Experiment Station.

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Tree species growing in the arboretum developed by the Pacific Northwest Forest Experiment Station at the Wind River nursery, Columbia National Forest, Wash., now number 132. In general there are about 20 specimens of each kind of tree planted. The established groups include 37 pines, 10 spruces, 9 balsam firs, and 40 different broad-leaved species. This year 25 lots of coniferous seed were sown in the nursery for future arboretum stock.

Kaibab Investigation Leads to Confirmation of Forest Service Policy

By C. E. Rachford, United States Forest Service

"There exists an urgent need for reducing the present number of deer in the Kaibab area to a point below the present limited carrying capacity of the range and maintaining the deer herd at such a level until such time as the various species of shrubs and young trees upon which the deer depend for browse are reestablished." In these words the committee recently appointed to investigate conditions on the Kaibab National Forest, Ariz., confirms a conclusion which was arrived at by the Forest Service as early as 1920 but which has repeatedly been questioned.

To bring about a definite settlement of differences in points of view regarding the Kaibab situation, the Forester this year invited a number of organizations interested in wild life and related subjects to select representatives who should serve as a committee to study the situation on the ground. As a result a committee representing some 12 organizations visited the Kaibab Forest June 8 to 15, 1931. It will be recalled that a similar committee made such an investigation in 1924 and recommended that at least one-half of the deer be removed at once. The members of the 1931 committee and the organizations they represented were as follows: T. Gilbert Pearson, National Association of Audubon Societies; George D. Pratt, American Game Association, American Forestry Association, and Camp Fire Club of America; Mark Anderson, Izaak Walton League of America; Joseph S. Dixon, National Park Service; E. Raymond Hall, American Society of Mammalogists; K. C. Kartchner, Arizona Game and Fish Commission; J. M. Macfarlane, American National Livestock Association; A. A. Nichol, University of Arizona and Arizona Game Protective Association; and Paul G. Redington, United States Bureau of Biological Survey.

The committee was accompanied by officers of the Forest Service, the Biological Survey, and the National Park Service, and by representatives of the University of Arizona, the National Woolgrowers Association, and cattlemen of the vicinity. Altogether, 28 individuals were present during all or a portion of the investigation. The report of the investigation indicates that in the 8-day period June 8 to 15 the committee traveled approximately 650 miles and observed practically every forest type and condition within the Kaibab Forest. That the investigation could be completed in such a short time demonstrates careful planning and speaks well for road and transportation facilities on the forest.

The Kaibab area, in the words of the committee, is "bounded on three sides by cliffs which almost everywhere are wholly inaccessible, and on the remaining side an inhospitable desert completes the total isolation of the area so far as the big game of the region is concerned." Although 15,000 cattle and horses and some 5,000 sheep were grazing on the area in 1913, the committee finds that at present domestic animals "have been reduced to almost insignificant numbers, considering the size of the area."

Following up its statement that there has been much loss to the Kaibab deer herd owing to starvation on the winter range, the committee explains as follows one of the main causes of the general misunderstanding of the Kaibab deer situation:

> It is a curious fact that there are some regions on the Kaibab where forage for deer still persists to considerable extent that is little utilized by these animals. The mule deer is very local in its range, and many die of starvation within a few miles of food that might be secured if they would only travel a short distance from their natural habitat. For example, this is especially noticeable on the northern part of the Kaibab Plateau, which is traversed by the main road over which visitors usually come into the Kaibab. A traveler entering from the north may see beside the road areas of cliff rose bearing leaves within reach of the deer. Also here and there are patches of locust, oak, and even a limited amount of low aspen. The casual visitor, therefore, may readily get the erroneous idea that there is still much forage for deer in the entire region, and that all is well with the deer. This idea is further accentuated when the large number of deer are observed feeding in the meadows of VT and Little Parks.
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> One must go back into the forest and down onto the winter range areas to get a real appreciation of the general lack of forage. Absence of sufficient water is one of the reasons why the deer do not use the north end of the plateau in summer. The mule deer seem to have very fixed habits of going to certain areas for winter regardless of whether or not sufficient forage is available.

For many years the Forest Service has held that numbers of all classes of animals on a national forest area should conform to the productive capacity of that area. The principle is definitely recognized in the following statement by the committee:

> It is desirable to have as many deer within the Kaibab Forest as the available forage supply will permanently support, not only that these deer may serve as a great tourist attraction but in order that the surplus may be utilized by man.

Perhaps the committee's most significant statement concerning the present condition of the range is the following:

> It is the conclusion of the committee, after carefully reviewing the general condition of the Kaibab range, and also observing the degree of recovery within the fenced experimental plots, that the Kaibab area is not now producing more than 10 per cent of the available and nutritious forage that this range once produced.

Present conditions and their causes, with suggestions for their amelioration, are presented as follows:

> No doubt the entire accessible Kaibab area has suffered at least two periods of severe range depletion—first by domestic grazing animals, and then by deer. * * *
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> The forage of the entire Kaibab area is yet in a deplorable condition and, with the exception of the east side winter range, it is doubtful whether there has been any considerable range recovery due to the reduction[1] the deer herd. * * *
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> The committee considers the total lack of asp reproduction, the continuous browsing of conif species, and the deterioration of the best remaini browse species an indication that the deer are still numerous as to make range recovery impossible. V therefore recommend that supervised hunting be co tinued and that a removal not less than that of la season, including both sexes, be effected this fall l licensed hunters or by other legal methods.
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> Cattle and horses are mainly grass eaters when gra is available. Deer, on the other hand, prefer wee and browse. There is, however, conflict in the use forage as between cattle and deer when utilization carried to the extreme. Cliff rose is one of the valuab and originally abundant browse species that has su fered greatly from a double use by both deer and catt on the winter range of the Kaibab. It is desirabl therefore, as a measure of range restoration, to elim nate unauthorized cattle as well as to reduce the de to a point where these choice browse species will l able to recover. It is also apparent that if overgrazi continues the aspen forest type will ultimately di appear from the Kaibab Plateau. There is pra tically no aspen reproduction anywhere now. A ve few yellow pine seedlings are "getting away" out reach of the deer. Conifer reproduction within th Kaibab under present conditions is virtually impossibl Practically all pine, spruce, and fir reproduction ha developed a peculiar Kaibab form, due to repeate browsing of terminal buds by the deer.

The committee emphasizes the fact that the Kaiba National Forest and the Grand Canyon National Par form a biological unit and that the policies under whic the two areas are administered should be closely co ordinated. Range depletion, it points out, is generall as serious within the park as within the forest. Th committee approves cooperative plans such as thos now in effect between the Forest Service and the Stat of Arizona, and records the opinion that there is a nee for more coordination and cooperation among Federa bureaus concerned with the biological and economi problems affecting the management of Federal land and the plant and animal life produced thereon. Expansion of research through the use of facilities and personnel of State colleges is recommended.

Final recommendations of the committee call fo additional man power for field administration; restric tion of domestic livestock grazed on the area to presen numbers so long as the range remains in a deplete condition; reduction of the number of deer to a poin considerably below the present limited carrying capac ity of the range, and maintenance of the herd at tha level until such time as the various species of shrub and young trees are reestablished; after the range i restored to normal productivity, allowance of such increases in the number of deer as the natural food supply may sustain; leaving undisturbed on the area all form native wild animal life other than deer, except for entific purposes or where serious damage is being ne to private property; continuance of suspension of ate and Federal predatory animal control and closure the area to private trapping and hunting of flesh-ting animals until the deer herd is adequately re-ced.

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[1] Since 1924 the State of Arizona has been issuing licenses to hunters t kill deer on the Kaibab National Forest. In the period 1924-1930 mor than 12,600 deer were killed by licensed hunters. The total number so removed in 1930 was 5,033. In 1928, 1,124 deer were killed by Government hunters. In addition, a few have been shipped out by forest officers for use in stocking other areas.

Obviously, the report of the committee is most grati-ing to the Forest Service. It marks a milestone in operative action, attests the soundness of the service licy, and indicates the need of extending the plan to her areas where similar conditions are known to exist.

Forest Economics in the Kentucky Mountains

By Ronald B. Craig, United States Forest Service

To find an area of nearly 170,000 acres in the eastern nited States on which the net annual forest growth ceeds the total annual cut nearly 3 to 1 might seem impossibility to those who believe that our eastern rests were long since depleted. Such an area exists, wever, in Knott County, Ky., and in the summer of 930 was made the field of an intensive land economic rvey in which the Forest Service collaborated with the ureau of Agricultural Economics, the Bureau of ome Economics, and the University of Kentucky.

Knott County lies in southeastern Kentucky, near e Virginia line, on the maturely dissected Cumber-nd Plateau. Elevations range from 700 to 2,300 feet bove sea level. The county is characterized by steep opes, narrow V-shaped valleys, and extremely narrow dges which in places become true hogbacks. Tim-erland makes up 75 per cent of the county's area. he remaining 25 per cent is in use for crops, pasture, nd residential purposes. The total area is 226,800 cres, and the population (as of 1930) is 15,430 or 43 er square mile.

The forests of the county are about 95 per cent ardwood. Hickory is the commonest species, followed y numerous species of oak, the two genera together orming 63 per cent of the total number of trees on the lots measured. Beech and yellow poplar together orm 15 per cent of the total number, and red maple per cent. The remaining 15 per cent include a large umber of species, no one of which forms more than 3½ er cent of the total. The softwoods are hemlock, ellow pines, and cedar. Altogether, 63 arborescent pecies were found, of which 35 are of general com-mercial importance.

The present total stand is about 1,250,000,000 feet oard measure; but about 460,000,000 feet of this is de-ective, owing to past fires and to the chestnut blight. Of the 790,000,000 feet of sound timber, 65 per cent, or 511,000,000 feet, is of merchantable size. The average stand of all types and age classes has a volume of 4,700 board feet per acre and a net annual increment of 140 board feet per acre. The net annual increment for the whole county is 24,400,000 feet board measure.

Utilization of this forest resource is still more or less desultory. Except on small areas immediately adjacent to the mines in Yellow Creek and Beaver Creek, most of the lumbering is done by resident farmers owning a small portable mill which they operate only when a neighbor brings in a load of logs or when they have a sure market for a certain type of product. There are a few purely commercial mills in the county, but most of these are under contract to a near-by mine. The average annual production of forest products for the biennium 1929–30 was 6,614,000 feet board measure, of which crossties formed 294,000 feet and staves 840,000 feet, the balance being lumber and sawed mine timbers. The total annual drain on the forest, including not only the products just listed but round mine timbers, fuel wood, timber used for farm maintenance, and waste, is about 8,400,000 board feet. This is only 34 per cent of the net annual increment. There is no threat of a timber famine in Knott County, Ky.

The picture of the county's agriculture is very different. Because the area of good bottom-land soil is extremely limited, it has long been the practice to crop the steep slopes to corn. Inasmuch as the soil is a sandy loam with a clay subsoil, this results in very rapid sheet erosion and even some severe gully erosion, and in consequent loss of soil fertility. The farmer is then compelled to clear additional forest land farther up the slope, where erosion is even more rapid. The end result, now beginning to be very apparent in most sections of the county, is a soil condition in which it costs nearly as much to produce a bushel of corn as can be realized from its sale. In many areas the production cost of corn is much greater than its sale value. If this practice continues, another two or three decades will see the end of all profitable corn production, save on the limited area of bottom land. Corn is the principal cash crop now raised. Diversified farming might help the county's land-utilization problem, but it will not solve it.

The existence of these two conditions—forest resources virtually untouched and agricultural soil rapidly approaching depletion—seems to indicate the need of a change in the people's source of livelihood. Coal mining and the development of gas and oil wells are the only industries now in operation in the county, unless the manufacture of a small quantity of raw lumber be included in that classification. The greatest opportunity for improving the people's present standard of living lies in the development of wood-using industries, such as the manufacture of furniture, veneers, novelties, and wood pulp. It is probable that the coal, oil, and gas fields within the county will be more intensively developed within a few years, which would aid the people to obtain a better living. The only barrier to the success of such an undertaking is the lack of good roads or a railroad. The existing highways are totally inadequate for the needs of the county and must be extensively improved if the county is to progress at all. Once this is done, it should not be difficult to capitalize the appeal of this region to the manufacturer of wood products. Raw materials, fuel, power, and skilled labor are all here in abundance and at low cost. With such a combination a live manufacturer should be able to compete successfully in the national market.

Here, then, is an area where the forest problem is one not of past overexploitation but of present underutilization. In respect to volume per acre, annual growth, and present utilization, Knott County is typical of most of the Cumberland Plateau region of more than 1,500 square miles, except for those portions adjacent to railroads. The possibilities in this region for the immediate practice of at least an elementary form of forestry appear to be excellent, not only from the standpoint of silvicultural theory but from that of profit to the timber owner.

National Forest Timber Sales to Be Restricted During Economic Depression

A revised timber-sale policy put into effect by the Forest Service on May 19 at the instance of President Hoover, to be effective while the present economic depression continues, places restrictions on sales of timber the value of which exceeds $500. Such sales will be made only to supply the needs of already existing sawmills that are dependent upon the national forests for their raw material and can not obtain their raw material elsewhere; to furnish domestic paper mills with raw material needed to supply the domestic market with newsprint and other wood-pulp products; and to dispose of wind-thrown, fire-damaged, or fire-killed and insect-infested timber. The exception concerning pulpwood is due to the fact that more than half the paper consumed in the United States originates, as wood, in other countries, from which it is imported as either pulpwood, wood pulp, or paper.

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The Ozark nursery of the United States Forest Service, established near Russellville, Ark, on land belonging to the Arkansas Polytechnic College, has been enlarged this year from 1.04 acres to 3.87 acres. If longleaf pine seed is available it is planned to sow it this fall in sufficient quantity to produce 1,000,000 or more seedlings. A nursery building 16 feet by 30 feet, with a concrete floor and a storage loft, was erected early in 1930. Mourning doves and English sparrows have been very troublesome at this nursery, so that it will be necessary to provide bird screens for all beds.

Recovery of Western Yellow Pine Fr Browsing Injury

A western yellow pine in its second year will p ably survive browsing injury if a fascicle of permai leaves or several of the younger primary leaves left, according to findings of the Southwestern Fo Experiment Station. If only a few of the older mary leaves or cotyledons remain the plant may expected to die, because the primary leaves are sl lived and soon fall off. If the stem is bitten ofl low that all the leaves are removed, death of the pl is certain.

These conclusions, drawn from field observati were confirmed through tests made with seedlings years old growing in drills in nursery beds. Tl rows of seedlings were cut back on July 30, each in a manner simulating a different degree of brows injury, and other rows were so treated on Septem 15. In the following May no appreciable differe was observed between the trees treated in July those treated in September, other than the differe due to the fact that of the surviving plants th treated in July had had more time to put on n growth following injury. All seedlings surviving inj had formed small shoots or buds below the po of injury. By the following August all the seedli of which the current shoots had been cut back stubs about ½ inch long, and the surviving seedli from which the entire current year's shoot had be cut off, leaving only a rosette of primary leaves the old stem, had made substantial growth but h formed no definite leaders.

Field observations in the western yellow pine ty on national forests of the Southwest have led to t conclusion that tree seedlings are rarely injured either cattle or sheep during the year of germinatic

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Beech, elm, and ash seed are observed by the Ce tral States Forest Experiment Station to be unusual plentiful this year through Ohio and Indiana. statement by Joel Kinkaid, of Warsaw, Ind., th beech trees in northern Indiana were heavily lade with seed in 1909, the year following a great drough has given rise to speculation as to whether changes the carbohydrate-nitrogen ratio as a result of drougl may lead to the production of heavy tree-seed crops.

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On a forest area of the Clemson College Coast Experiment Farm near Summerville, S. C., that ha been burned over every year for 13 years, individu longleaf pines have made about 15 per cent less diamete growth and about 25 per cent less height growth tha trees on adjacent unburned land, according to meas urements taken by the Appalachian Forest Experimen Station.

mmer-Wood Formation in Southern Pines Dependent on Capacity of Soil to Retain Moisture

The quantity of summer wood formed by longleaf e trees growing in the deep, sandy soils of the Choc- vhatchee National Forest, Fla., is correlated fairly sely with the quantity of soil water currently ailable, according to the results of a Forest Products boratory experiment carried out in 1927, 1928, and 29. Groups of trees were irrigated for three years, d by means of increment borings the width of the mmer-wood portion of growth rings formed during e irrigation period was compared with the average r summer wood formed in the 14 preceding years. was found that during the experimental period nual summer growth had increased by 89.9 per cent trees irrigated from March to July only, by 94.6 r cent in trees irrigated from July to December ly, and by 165.9 per cent in trees irrigated through- t the growing season. On the check plot an increase 24.3 per cent was observed in summer wood formed nually during the experimental period.

Although irrigation of the southern yellow pine for- ts is not practicable, the results of this experiment lead to certain recommendations in regard to the anagement of such forests. To promote greater owth and the production of heavier and stronger ood, it is advised that efforts be made to maintain rest soil conditions such as will bring about the tention of moisture and make moisture continually ailable to the trees. In the southern pine region is is not a matter of conserving an inadequate water pply; usually, rainfall is abundant. Measures at would increase the organic content of the soil, the il fertility, and the capacity of the soil to retain ater are the exclusion of forest fires, a satisfactory tocking of forest areas, and an admixture of broad- eaved species with the conifers.

Concurrently with the experiments just described nd on the same site, complete fertilizer was applied o trees without water other than the natural precip- ation. This appeared to increase the trees' rate f diameter growth to a slight degree, but appeared o have less influence on the development of summer vood than on that of spring wood. A nitrate fertilizer vithout irrigation increased growth and especially he development of summer wood. In both cases it s likely that the unusual abundance of soil moisture vailable in 1928 and 1929 had as great an effect ipon the growth of the trees as the fertilizers.

A count of the cones borne by the trees on the irri- gated and the fertilized plots in 1929 indicated that cone production was stimulated by the treatment given, especially on the fertilized plots.

The site of these tests was an area of about 10 acres on the east bank of Garnier Creek, approximately 8 miles north of the Gulf of Mexico. The soil was a deep and nearly sterile Norfolk sand, which when tested showed only traces of available nitrogen and phosphorus. The longleaf pines, which, with oak sprouts, formed the only tree growth, were from 100 to 250 years old. They were 60 feet tall and ranged from 6 to 22 inches in diameter at breast height. When the root systems of trees near the experimental area were exposed by washing away the soil with water, it was found that by far the greater portion of the longleaf pine roots occupied the upper 18 inches of the soil. In this layer root competition was obviously very keen. Moisture determinations made two days after a 1-inch rainfall showed a moisture content of only 2⅔ per cent at depths to 6 feet; similar tests two days after a 3-inch rain showed the moisture content at the same depths to be about 5 per cent. Since 1913 the region has had an average annual rainfall of 60 inches or more; but seasons of extremely low rainfall occur, and the precipitation at times consists largely of heavy rains at infrequent intervals. The low moisture capacity of the sandy soil and the high summer temperatures bring about conditions not much more favorable for growth than those existing in semiarid regions.

Portions of Deschutes Forest Designated as Experimental Forest and Natural Area

A tract of 7,520 acres to be devoted to experimental use by the Pacific Northwest Forest Experiment Station has been set aside in T. 21 S., R. 9 E., on the Deschutes National Forest, Oreg., about 40 miles from Bend, Oreg. The area will be known as the Pringle Falls Experimental Forest. In climate, soil, and physiography it is typical of a long belt of western yellow pine land, and its timber is representative of a large territory of commercial pine forest in central Oregon. Besides containing mature western yellow pine it takes in lodgepole pumice flats characteristic of the country and some mixed conifer or sugar-pine type, the latter on buttes which rise about 800 feet above the general level. Located on a fair road, 6 miles from the Dalles-California State Highway, the tract is easily accessible throughout the year except at times of extreme snowfall. Small timber sales could conveniently be made on it at any time irrespective of large logging operations in the region, the cut being transported either by truck to a common-carrier railroad 7 miles away or by river driving.

Likewise on the Deschutes Forest, a unit of 1,440 acres in T. 12 S., R. 9 E., W. M., adjoining the Metolius River recreation strip, has been designated as the Metolius Natural Area, and is to be retained, so far as practicable, in an unmodified condition. This area lies within the Metolius River watershed, east of the river and about 5 miles below its visible source. On more than 90 per cent of the area the timber is considered as of the western yellow pine type, approximately 650 acres of this carrying commercial stands. The remainder is occupied by the mixed Douglas fir-white fir-western larch type, partly merchantable but not so classified at present from the practical logging standpoint. None of the area has been cut over, except very narrow clearings for old roads. Most of it has been burned over at one time or another, but there are no fresh burns and no barren areas. Elevation above sea level ranges from 2,800 to 4,800 feet. The soil is mostly of volcanic origin. The growing season is generally short. Reproduction sufficient for a complete stand is present practically everywhere on the area except under the denser groups of mature western yellow pine. The area is about 18 miles northwest of Sisters and 40 miles from Bend, and is readily accessible by a very good forest road following the east bank of the Metolius River.

Positive Gas and Water Pressure in Oaks

By C. A. Abell, United States Forest Service

Evidence of positive gas and water pressure in forest trees came to my attention during the late summer and early fall of 1930 in western North Carolina and northern Georgia hardwood forests. In connection with a growth study carried on by the Appalachian Forest Experiment Station, numerous forest trees were drilled with the increment borer. Frequently after the bit had been inserted 2 inches or more into a scarlet oak (*Quercus coccinea*) the tree would emit enough liquid to cause a dripping from the outer end of the borer. Often there was an accompanying hissing sound as if gas were escaping.

One 14-inch scarlet oak, apparently sound, was encountered that had water pressure enough to eject the 3-inch core with considerable force and follow it with a stream of liquid which was thrown 3 to 4 feet from the base of the tree. This liquid had the characteristic bad odor of scarlet-oak sap. The occurrence seems more remarkable because of the very dry season preceding it. At that time, late summer, the rainfall deficiency for the calendar year was 12.73 inches related to a normal of 40.28 inches.

The only two species in which inflammable gas was found were the chestnut oak (*Quercus montana*) and the white oak (*Quercus alba*). In some trees of these species, ranging from 8 to 16 inches in diameter at breast height, the positive gas pressure was sufficient to blow the core out of the hollow bit with considerable force. The gas was frequently lighted and would shoot a blue flame, sometimes 1½ to 2½ feet long, extending horizontally near the source but gradually curving upward to its tip. The flame would burn steadily for 30 seconds or so, then gradually lose force and become smaller. It was usually snuffed out soon after it was lit, to preserve the temper of the bo In all trees issuing inflammable gas the heartwood unsound, apparently affected by a dry rot. Fail pressure could occasionally be revived by turning borer a little farther into the tree. Sometimes issuance of gas was stopped completely by turning borer too far. The fact that the flame was blue s gested methane, a gas known to be produced in decomposition of cellulose.

Lamar M. Wood, of the Michigan land econo survey, observed inflammable gas in white oak and red oak (*Quercus borealis*) while working on timb growth studies in West Virginia during the fall 1927.

Hogged Wood and Sawdust in Demand Pacific Northwest

A study recently completed by A. H. Hodgson a E. F. Rapraeger has brought out the fact that dur 1929 the sawmills of western Oregon and Washing produced and disposed of 4,289,062 units (1 unit= cubic feet) of hogged wood and sawdust. On the sumption that the fuel value of a unit of hogged w and sawdust is equal to that of 2½ barrels of cr oil, it is estimated that the year's consumption the equivalent of 9,650,312 barrels of crude oil.

The principal users of hogged wood and sawdust sawmills, pulp and paper mills, and electric po companies. The following table shows the distri tion of use of these commodities in 1929 within region studied:

Class of consumers	Western Washington		Western Oregon		Total	
	Number of users	Consumption	Number of users	Consumption	Number of users	Co sum tio
		Units of 200 cubic feet		*Units of 200 cubic feet*		*Unit 200 cu feet*
Sawmills	356	1, 269, 314	450	711, 817	806	1, 981,
Pulp and paper companies	14	923, 661	6	142, 044	20	1, 065,
Power companies	2	195, 914	8	456, 662	10	652,
Apartments and office buildings	150	81, 308	65	11, 000	215	92,
Schools and public buildings	51	54, 000	83	32, 478	134	86,
Residences	5, 213	77, 915	6, 780	65, 800	11, 993	143,
Others [1]	68	173, 998	80	93, 151	148	267,
Total consumption	------	2, 776, 110	------	1, 512, 952	------	4, 289,
Total production	------	2, 778, 940	------	1, 510, 122	------	4, 289,

[1] Includes laundries, milk condenseries, packing companies, a creosoting plants.

Sawdust burners installed in residences now numb 6,272 in Portland and 3,800 in Seattle.

Laundries and milk condenseries favor hogged wo as a fuel because of its thermal properties, availabili at low cost, and cleanliness.

ycamores Defoliated in Central States

Severe defoliation of native sycamore trees, in some ses almost complete, has been observed this year by e Central States Forest Experiment Station. Some ury was done to the trees by frost killing of the buds, d this has been accompanied by an attack of a para-ic fungus which works on the cambium layer of the twigs, sometimes completely girdling the twigs. This injury has been observed from central Illinois to eastern Ohio and is so severe that in June many trees seemed to be on the verge of dying. The trees may recover through development of adventitious buds. The disease has tentatively been identified as sycamore anthracnose, which has been present in the region for several years.

General Forest News

ndian Service Lowers Cost of Opening Logging Railroad Grades to Motor Travel

It cost the Indian Service only $26.74 per mile to ansform abandoned logging railroads on the Klamath dian Reservation, Oreg., into automobile roads on hich a speed of 30 miles per hour can be maintained. ogging operations had covered approximately 175,000 the 800,000 acres of timberland included in the servation, and on this cut-over area remained a etwork of logging railroads spaced about one-half ile apart. The roads averaged less than 3 per cent grade and in no case exceeded 5 per cent. Opening ese roads to motor travel meant making all parts of e cut-over land accessible to fire-protection forces nd developing a network of firebreaks.

In the spring of 1930 a "20 motor patrol," manufac-ured by the Caterpillar Tractor Co., was purchased r use in "blading" out the roadbeds following re-oval of the ties. In some places it was found neces-ary to blade the earth away to a depth of 14 inches in rder to eliminate the "washboard" effect left when e ties were removed. The machine easily blades out mile of road a day.

In some places the logging companies had removed he ties for use elsewhere. Where this had not been one the work of adapting the roads to motor travel was retarded because of the labor involved in removing pproximately 3,675 ties per mile. This delay and he expense of the whole operation were greatly decreased through the use of a "tie-bumping machine" devised by Allen F. Space, in charge of road construction on the Klamath Reservation. This machine, described by Ranger Space in the 1931 Idaho Forester, published by the University of Idaho, is made of two pieces of 90-pound railroad steel and is attached to the front of the "motor patrol." One piece is a 7-foot "rooter," set 8 inches to the left of the center of the patrol, which pierces the earth 1 inch below the ties and, raising the ties from the roadbed, swings them to the right. The second piece is bent into a circular shape and extends over the right wheel of the motor patrol, reaching the ground 10 inches in front of the wheel. This piece pushes the ties still farther to the right, after which the blade of the motor patrol crowds them off the grade. It was found best to have the rooter go under the ties about 16 inches from their left end.

The completed motor ways were mapped, numbered, and marked with signboards. Before these roads were opened the time elapsing between the first report of a fire and the attack of the fire fighters averaged three hours. It is now possible to place men at any point within the area in one hour's time.

National Park Research Reserves

The National Park Service has adopted a definite policy of setting aside selected national park areas as research reserves. On these areas the service will endeavor to maintain unmodified natural conditions for educational and scientific purposes. The research reserves will be located in isolated sections of the parks and will not be approached by roads or trails. Special permits will be required to enter any of them.

Two research reserves have been in existence in national parks for some time, one having been established in Yosemite Park in 1926 and one in Mount Rainier Park in 1928.

Osceola National Forest Site Chosen for Naval Stores Laboratory

The naval stores laboratory for which Congress has made an appropriation of $40,000 available to the Bureau of Chemistry and Soils is to be established on the Osceola National Forest, Fla. It will be located near Olustee, about 12 miles east of Lake City. The location on the national forest will make it possible for the laboratory staff to obtain resin from longleaf and slash pines grown under a wide variety of conditions. The gum will be obtained from naval stores operators who have purchased cupping rights on the national forest. The area on which the buildings for the laboratory are to be erected is part of an experimental forest on which the Southern Forest Experiment Station is planning to conduct both silvicultural and naval stores research.

Carolina Fiber Co. Practices Forestry

The Carolina Fiber Co., paper manufacturers and large-scale farmers, have been practicing forestry for about 10 years on their 30,000-acre property near Lane, S. C. They are cutting only about one-half or one-third their annual timber growth, and are protecting their timberlands from fire with care and with success. Some thinning has been done to get out pulpwood and improve growth. For the past two years the company has been planting slash pine on fields which it could not cultivate to advantage and could not rent at a satisfactory rate. Pines were planted on 75 acres in the winter of 1929–30 and on 200 acres in the winter of 1930–31. The planting has cost only about $2 per acre, and results have been excellent. Responsibility for the forestry work, including fire protection, rests on the company's manager of farm land and timberland, C. A. Coleman.

Indian Service Forestry Branch Will Supervise Grazing Activities

The Secretary of the Interior has approved the recommendation of the Commission on Indian Affairs that all grazing activities on Indian reservations be placed under the supervision of the forestry branch of the Indian Service. During the past year an extensive reconnaissance has been conducted on some of the more important reservations. On the basis of information obtained through this work new regulations have been formulated and approved by the department which are designed to bring about uniformity in management and conservative use of grazing resources. Grazing experts are being employed as fast as funds and the requirements warrant.

"Bitterweed" Poisoning of Livestock

Sickness and death of sheep resulting from poisoning with *Actinea odorata,* a plant known locally as "bitterweed" has been reported with increasing frequency within the past five or six years from the Edwards Plateau country of western Texas. *Actinea odorata* has been known for many years to be present in western Texas; within the past few years it has very rapidly increased in abundance in that locality. The plant is distributed from southwestern Kansas and central Texas across southern New Mexico and Arizona to southeastern California. Reports of "bitterweed" poisoning, however, have come to the Bureau of Animal Industry from the Edwards Plateau country only. The reports indicate that sheep are the animals principally affected, but that goats and cattle also are susceptible.

Results of preliminary experiments made by the Bureau of Animal Industry in the summer of 1930 indicate that if a sheep eats 1.3 per cent of its own weight of green "bitterweed" in one day it may from acute poisoning, and that a sheep may beco chronically poisoned if it eats as little as 0.1 per c of its own weight of the plant daily for about weeks. No specific remedy is known. Poiso animals should be put where there is none of the pl and should be given plenty of good wholesome f and plenty of fresh, clean water.

Facts established in recent years that may b directly on the increased abundance of *Actinea o rata* and on the increased number of cases of p soning from this cause is that long-continued ov grazing, by depleting nutritious forage plants, gi obnoxious plants a chance to get a foothold, and t when animals eat poisonous plants it is usually beca of lack of proper food. It is pointed out, also, that af subsisting on dry forage for weeks or months she become ravenously hungry for green feed and f quently will eat almost any green plant that is ava able. A special factor in the dangerousness of t "bitterweed" is its habit of starting growth at a time of year, whenever conditions of moisture a temperature are favorable.

Georgia Firm Tests French Turpentinin System

The French system of turpentining is being intr duced by the Brunswick Peninsula Co. on lands Glynn and Ware Counties, Ga. The operation involv four crops of about 6,000 cups each. For each cr the entire operation of chipping the trees and dippi the gum will be handled by one man, working und the direction of R. E. Benedict, the company's forest By chipping French faces only 2 to 4 inches wide a freshening these faces weekly with the removal of thin shaving only about one-fourth inch thick, M Benedict believes he can obtain a profitable gum yie from much old back-boxed timber that would n support the typical American face 6 to 14 inches wid

Each of the turpentine farmers will live near t tract of timber for which he is responsible, and conjunction with his work on the timber will gro livestock, feed, and vegetables. One reason for di tributing the woods workers over the forest is t belief that better fire protection can be obtained this way than by housing them in centralized cam or quarters.

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A sudden increase of the western pine beetle too place last year on plots of western yellow pine timb on the Sierra National Forest, Calif., where the inse had been in an endemic status for four years. Exam ining the plots in the spring of 1931, Entomologis J. M. Miller found that large groups of trees had bee attacked.

Chinese Elms for Oklahoma Golf Courses

High praise for the Chinese elm comes from Jay C. ainter, of the Oklahoma State Golf Association. Five ars ago Mr. Painter planted some seedlings of this ecies obtained from the United States Department Agriculture, and since then he has grown several ousand of the trees from seed imported from China. July, 1930, some of the latter, grown from seed nported in July, 1926, were 6 inches in diameter and om 20 to 30 feet high. During the past two years the anting has been continued without the necessity of nporting seed, because trees of the earlier plantings ad come into bearing. The trees have shown no susptibility to disease or to the attack of insects, require ry little water, and "have lived through our hot and y Oklahoma summers without any attention whatver."

The Chinese elm is particularly desirable for use on lf courses, Mr. Painter explains, because its leaves, nly about one-fourth as large as those of the American m, do not litter up the fairways and greens in the late ll. The trees leaf out very early in the spring and tain their foliage long after other deciduous trees are are.

Tent Caterpillar Defoliating Virginia Forests

One of the worst outbreaks of the forest tent caterillar ever recorded by the United States Bureau of ntomology has taken place this year in Buckingham nd Fluvanna Counties, Va. Complete defoliation of orest trees has been observed over considerable areas. s other outstanding forest entomological conditions of 931 the bureau reports that the larch case bearer is eavily infesting the larch of New Hampshire, Vernont, and parts of Pennsylvania, heavy stands appearng as if scorched by fire owing to the feeding of this nsect, and that the European pine shoot moth is ecoming generally prevalent in southern New England, southern New York, New Jersey, and Pennsylania, infestation being confined thus far to nurseries nd transplanted trees.

New Instruments for the Weather Men

Development of two new instruments for measuring ind velocities is reported by the American Meteorogical Society. One is a small hand anemometer degned to measure wind velocities under 10 miles an our. This device, developed from a hot wire grid, is o delicate that the needle on its gauge vibrates when emonstrators breathe against it. The other is deribed by Capt. James A. Code, jr., as follows: "To overcome poor visibility under cloudy or foggy conditions the Signal Corps has developed a radio transmitter which is attached to several balloons and tracked by two direction finders located at the ends of a known base line. With the angles thus determined, the ascensional rate of the balloon is known, and its elevation and hence the speed and direction of the wind can be calculated at various levels."

American Forestry Association Meets

Acquisition of national and State forests, control of erosion, and the solution of the idle-land problem were prominent among the subjects discussed during the annual meeting of the American Forestry Association, held jointly with that of the North Carolina Forestry Association in Asheville, N. C., June 3–5. Nearly 400 attendants heard talks by Ray Lyman Wilbur, Secretary of the Interior; Robert Y. Stuart, Chief of the United States Forest Service; Hugh Hammond Bennett, of the Bureau of Chemistry and Soils; William G. Howard, superintendent of forests and parks, New York; L. C. Gray, of the United States Bureau of Land Economics; and Henry S. Graves, dean of the Yale School of Forestry. Other features of the meeting were the planting of a George Washington memorial walnut tree by Boy Scouts on the Asheville city-county plaza; a trip to Mount Pisgah on the Pisgah National Forest; the first public showing of the association's new 3-reel educational motion picture, "Burnin' Bill"; and a visit to the large rayon plant of the American Enka Corporation, near Asheville, where the delegates saw rayon being made from 100 per cent spruce pulp. The forestry cup annually awarded by the association on the basis of a competitive showing of forestry educational material was won for the third time by the Western Forestry and Conservation Association, of Portland, Oreg.

George D. Pratt, of New York, was reelected president of the association, and two new directors were named—C. Arthur Bruce, of Tennessee, director of the Hardwood Manufacturers Association, and Joy Morton, of Illinois, founder of the Morton Arboretum.

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Bigleaf maple logs, producing highly figured veneers, are being purchased by one concern in the Pacific Northwest at $175 per 1,000 board feet. The logs are usually cut into 1/28-inch veneer, the bulk of which is shipped to eastern furniture manufacturers and used for overlays and inlays in high-grade furniture. Oregon white oak logs 14 to 16 feet long, straight and clear, are being bought by another concern at $75 per 1,000 board feet. They are cut into timbers which are used largely in the pulp and paper mills of the region for machinery foundation purposes.

Foreign Notes

The National Pinetum at Bedgebury

By W. Dallimore

[From Bulletin of Miscellaneous Information, Royal Botanic Gardens, Kew, No. 4, 1931]

Increasingly unsatisfactory atmospheric conditions at Kew, together with natural soil that is not very suitable for certain genera of coniferous trees, proved, after a long trial, that the attempt to cultivate a full collection of hardy conifers in the Royal Botanic Gardens, Kew, must sooner or later be abandoned. With this in mind an arrangement was made whereby Kew and the forestry commission should become jointly responsible for the formation of a new national pinetum on forestry commission land at Bedgebury in Kent, where numerous well-grown conifers 45 years old and upward already existed.

In view of the difficulties created in the past through lack of historical data connected with many famous collections of trees, the committee responsible for the undertaking made provision for recording planting operations, the enumeration of plants, and a quinquennial review of the pinetum and its contents. To aid in this a planting book has been kept in which all the trees are entered with species index numbers from 1 upward, whilst the individual plants of a species are given a letter from A onward—e. g., *Abies lowiana* 3.A: 3.B: 3.C: 3.D: 3.E: 3.F. Varieties are further separated by means of other signs, as *Abies lowiana* var. glauca 3.×A: 3.×B: 3.×C. As these indicatory signs are given on the permanent labels attached to the plants, it is possible with little trouble to keep a definite record of each individual.

A number of plants were sent from Kew to the forestry commission's nursery for the new pinetum in 1924, but it was in March, 1925, that planting was begun; the first quinquennial period, therefore, closed in 1930. In order to bring later planted trees into line with those planted in 1925 for the review in 1935, all plants were remeasured at the end of the 1930 growing period. Thus, whilst some plants had had six growing seasons at Bedgebury, others had had only five, four, three, two, or one. The majority, however, were planted in February, 1926.

Where a large collection of trees from all the temperate parts of the world is assembled, there are bound to be some that do not thrive so well as others, and the collection at Bedgebury is no exception. The general condition of the trees, however, justifies optimistic opinions for the future of the undertaking. In some instances extraordinary growth has been made, and the trees have an appearance of rude health. In other cases growth has not reached expectations; but even such instances it is comforting to find that root acti has been particularly vigorous, even though bran development has been slow.

The five years 1925–1930 were not particular favorable to tree growth, and the more or less expect cultural difficulties incidental to the establishment o large collection of trees have been present.

During the springs of 1926, 1927, and 1928 there we severe frosts which seriously injured the earlier-gro ing species, more particularly Abies and Picea. Son did not recover; others, due to an excellent root syste have formed strong new leading shoots from advent tious stem buds. As the small plants have been foun to suffer from spring frosts much more severely th taller ones, it is hoped that as height increases danger from late spring frosts will gradually disappea Unusually severe weather was experienced during t winter of 1928–29 which resulted in the death of number of more or less tender species, some of which ha passed through one, two, or three winters with litt injury. The growing seasons of 1929 and 1930 we favorable and little harm was caused by spring frost.

Insect pests have been troublesome throughout t five years the pinetum has been in existence. Pi weevils and pine beetles, in the earlier days, caused good deal of injury amongst young pine trees, b constant trapping had the desired effect, and no damag from these pests has been noticed during the last tw years. A little injury is being caused by the pine-sho tortrix moth and the pine sawfly, but hand picking ha kept them from making progress. The presence green spruce aphis on several species of Picea, an Dreyfusia on certain species of Abies, is a more seriou problem, for the pests are abundant on large trees i the vicinity, and as fast as young trees are cleaned b spraying, insects appear again from surrounding tree The Piceas most susceptible to attack are *P. alb P. sitchensis*, *P. pungens*, and *P. engelmanni*, an throughout the growing season it is necessary to spra them at least once a fortnight. In January of th present year the green spruce aphis was active an breeding. The larch shoot moth (*Argyresthia laevig atella*) is present on the larches, but it is not doin much harm.

Fungus diseases have caused the death of a numbe of trees. Of these the honey fungus (*Armillaria mellea* has taken the highest toll. As there are so many dea stumps of trees about the ground, losses from this dis ease must be expected * * *. Weymouth pine

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[2] Pinus strobus, known in the United States as northern white pine.—Ed.

st (*Cronartium ribicolum*) has been noted amongst e 5-leaved pines, and affected trees of *Pinus strobus*, *excelsa*, and *P. armandii* have been destroyed in an deavor to prevent the spread of the disease * * *. An item of considerable interest in the pinetum is e natural regeneration that is in progress. In some rts young Scots pine have been numerous enough to rm a well-stocked forest. Other naturally regener- ed trees are Lawson cypress, Douglas fir, Sitka ruce, *Thuja plicata*, *Tsuga albertiana*, and *Abies andis*, in addition to common trees such as holly, k, sweet chestnut, etc. Amongst the Scots pines a od deal of difference is noticeable in length, width, d shape of leaf.

The violent winds experienced during the autumns of 28 and 1929 blew down between 30 and 40 old speci- ens of *Pinus sylvestris*, *Abies grandis*, *Cupressus yoides*, *C. lawsoniana*, *Thuja plicata*, *Pinus bank- ana*, and other trees. Many of these were between and 90 feet high and 50 or 60 years old. Most of e trees blown down were in places where the water ble was within 12 or 15 inches of the surface and the ees were very shallowly rooted.

Norway Spruce for Windbreaks in Eastern Canada

A single row of Norway spruces 8 to 10 feet apart akes a good windbreak for the protection of houses nd farmyards in eastern Canada, according to W. T. Iacoun, Dominion horticulturist. This tree grows apidly and is hardy in almost any place where apples an be grown successfully. Eventually the trees have a pread of 25 or 30 feet. In very exposed places a row f Norway spruces may be planted 8 to 10 feet behind row of northern white cedar, which is rather slow rowing. Northern white pine, European larch, ombardy poplar, and Austrian pine are recommended s rapid-growing trees that may be used for windbreaks eastern Canada. The windbreak should be at least 0 feet away from the buildings it is desired to protect. f it is closer the accumulation of snow may be too reat. On the prairies the native white spruce *Picea canadensis*) is recommended for windbreak lanting. Here a closer spacing is suggested.

National Parks and Forest Reserves of Poland

Poland has 6 national parks, with a total area of 5,196 hectares, and 48 forest reserves aggregating ,469 hectares. Especially well known is the park of Bielowieza, northeast of Warsaw, in the center of an xtensive wooded area which at the time of the Russian omination was a Crown forest. Here the timber is redominantly of pine, oak, beech, and alder, and pecimen trees of great stature are numerous. Likewise in the forest of Bielowieza two reserves have been created with the purpose of conserving exceptionally interesting stands of fir and Scotch pine. Aside from their forest growth, features of the parks are peaks with elevations as high as 2,663 meters and a variety of wild life, including chamois, marmot, bear, lynx, deer, and eagle.

The creation of national parks and forest reserves is a function of the Polish National Council for the Protection of Nature, which has been in existence since 1925 as an official body presided over by a deputy of the Minister of Public Instruction. For five years prior to that date the council, of 20 members, was active as a provisional consultative commission. During both periods it has had as its president W. Szafer, professor of botany in the University of Cracow. The council publishes an annual and many popular and scientific bulletins.

Neuchatel Reserves a "Natural Area"

The Bois des Lattes, in the Canton of Neuchatel, Switzerland, has been purchased with public and private funds and set aside as a forest reserve. H. Spinner, president of the cantonal commission for the protection of nature, explains in the Journal Forestier Suisse why this was done:

> The peat bogs of Neuchatel, celebrated in the works of Lesquereux, of Christ, of Früh, and of Schröter, are on the verge of disappearing. Exploitation, drainage, and cultivation are little by little destroying them; it is to be expected that they will do so. But when one area, easily accessible, epitomizes on less than 20 hectares the various stages of evolution of one of these peat bogs—prairie, flat marsh, marsh with hummocks [marais bombé], waste land, and forest—it should be conserved; that is what has been done in the case of the Bois des Lattes.

As a leading element in the scientific interest attaching to the area Professor Spinner mentions the opportunity to conserve certain plant species requiring the acid humus of the peat. Among these he names sphagnum, Andromeda, cranberry, sundew, Carex chordorrhiza, and dwarf birch. Besides this there is the opportunity for comparing the flora of the peat bog with that of neighboring lands and studying its origin and for reserving to future generations a specimen area, unaffected by the evolutionary cycle, of a type highly important in working out the history of the evolution of the forest following the disappearance of the glaciers. A secondary element is the fact that the Bois des Lattes was formerly a part of the estate of Combe-Varin, which was the rendezvous of a group of savants. The æsthetic interest of the peat bogs is no less, avers Professor Spinner; at every season the new reserve presents an interesting and varied aspect, as the paintings of Jean Mathey attest.

The management of the area has been intrusted to the University of Neuchatel.

Nearly One-third of Bavaria Forested

Bavaria contains 19.6 per cent of Germany's total forest area of 12,600,000 hectares, according to information transmitted by Consul General Charles M. Hathaway, jr., Munich. Forests occupy 32.6 per cent of Bavaria's total area, as contrasted with 27 per cent of the area of the Republic and 25 per cent of that of Prussia. Of the total forested area in Germany, 32.6 per cent is the property of the Republic and the States, 15.5 per cent is communal property, and 47.8 per cent is in private ownership; in Bavaria 33.7 per cent is the property of the Republic and the States, 12.9 per cent is the property of the communes, and 49.7 per cent is privately owned. The proportion of forested area privately owned rises to 51.5 per cent in Prussia; in Wurttemberg and Baden, where communal owners is high, it falls to 34.5 per cent and 35.5 per ce respectively. Coniferous forests compose 79 per c of the Bavarian total.

The figures quoted were derived from the Germ forest census of 1927.

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Italy's celebration, last September, of the two-tho sandth anniversary of the birth of Virgil culminat in the inauguration of a Vergilian park, near Mantu The preparation of the park had been in progress sin December, 1929. Its flora is said to include nearly the woody and herbaceous species mentioned in t Georgics.

Personals

The membership of the first Arkansas Forestry Commission is as follows: H. R. Koen, supervisor of the Ozark National Forest; A. L. Strauss, of the Malvern Lumber Co., Malvern; and S. J. Arnold, general manager of the Crossett Lumber Co., Crossett.

The membership of the Utah State Land Board, recently appointed by Governor Dern under the provisions of an act reorganizing the board and giving it increased authority with regard to flood-control measures, is as follows: Elias A. Smith (chairman) and Joel R. Parrish, both employed on a per diem basis, and J. F. Mendenhall, employed as a full-time executive secretary.

D. Vivian Anderson, of Cincinnati, has been elected chairman of the Central States Forest Research Advisory Council for the coming year. Tom Wheeler continues as vice president and E. F. McCarthy as secretary.

Edwin A. Miller has been appointed a member of the California State Board of Forestry, filling the vacancy caused by the resignation of R. C. Harbison.

M. I. Bradner has been appointed director of the work to be done in the Inland Empire in connection with the forest survey now being made by the United States Forest Service under provisions of the McSweeney-McNary Research Act. Mr. Bradner will continue to be stationed at the Missoula, Mont., regional headquarters of the service, and will retain his position as chief of the office of forest products there.

Frank T. Murphey and Ira Bull now occupy the two extension forester's positions at the Pennsylvania State College, one of which was recently left vacant by the death of C. R. Anderson. Extension Forester Murphey recently received the master's degree from the Yale School of Forestry.

F. J. Hallauer, principal engineer of the Fore Products Laboratory, is being transferred to the Wasl ington office of the United States Forest Service t take charge of the requirements phase of the fore survey. This work will involve a study of past an present use of wood, of trends in that use and the causes, and of probable future trends. An effort will b made to determine to what extent the United State can meet its future wood needs and, if it is found tha our wood-productive capacity is likely to be greate than our needs, to ascertain the possibilities for a profitable disposition of the surplus. While a member o the laboratory staff Mr. Hallauer has made specia studies bearing directly on this phase of the survey including a study of the effect on wood use of competition from other materials.

J. Nelson Spaeth, of the New York State Agricultural College, will be on sabbatic leave during th school year 1931–32 and will spend the year workin for the doctorate as a fellow in the Yale School o Forestry.

Arthur Ringland sailed June 8 to enter upon his duties as forestry representative in Europe of the United States Department of Agriculture. After a brief sojourn in and near London he planned to go to Paris in July and there to attend the International Congress of Wood and Silviculture held in connection with the International Colonial Exposition.

Andrew E. Douglass, of the University of Arizona, has received a prize of $2,500 from the Research Corporation in recognition of his studies of the growth rings of trees as recording rainfall and his compilation on this basis of a calendar that goes back to 1000 B. C. The prize is one of two awarded by the corporation each year to scientists who have made important discoveries without expectation of pecuniary reward.

A. R. Mann, dean of the New York State Colleges Agriculture and Home Economics, has been elected to newly created position of provost of Cornell Uni- sity. Doctor Mann had been dean of the College Agriculture for 15 years. In assuming his new posi- n he will resign the deanship of the two State colleges.

Jeorge Sherman Avery, since 1928 a member of the ggett and Myers Research Foundation at Duke iversity, has been appointed professor of botany at Connecticut Agricultural College.

Members reappointed this spring to the North Caro- a Board of Conservation and Development are S. Askew, Merry Hill; R. Bruce Etheridge, Manteo; ntford Martin, Winston-Salem; and E. D. Cranford, heboro. All these men were members of the State's st board of conservation and development, appointed 1925 by Gov. A. W. McLean.

F. A. dos Santos Hall, assistant professor of forestry the University of Lisbon, Portugal, has come to the ited States for at least a year's study of forest men- ration on a Portuguese national scholarship. He is orking in the Washington (D. C.) office of the United ates Forest Service. Professor Hall has charge of vestigative work in the forest experiment station cently established by the Portuguese Government as part of the University of Lisbon. Much of his study as been in connection with French and Portuguese rpentining practices.

D. S. Jeffers, who spent the past school year as a aduate student in the Yale School of Forestry, has signed his forestry teaching position at the Iowa State ollege of Agriculture and accepted one in the Univer- ty of Washington.

Ralph C. Hall, assistant entomologist of the Division Forest Insects, United States Bureau of Entomology, as been assigned to the Central States Forest Experi- nent Station this year to study the locust borer. In the entral States there are few black locust trees that have eached the age of 10 years without being injured by is insect. Mr. Hall will work in close cooperation ith L. F. Kellogg, who will have a party in the field udying the growth and yield of black locust with articular reference to plantations. This party will iclude A. G. Chapman, who in partial fulfillment of the equirements for a doctor's degree is making a study f the influence of nitrogen-fixing bacteria upon the growth of the black locust.

Lewis M. Turner has accepted appointment as assist- nt professor of forestry at the University of Arkansas. Mr. Turner received the bachelor's and master's legrees from the University of Illinois in 1923 and 1925, espectively, his graduate work being in the field of otany. He taught biological science in Blackburn unior College, Carlinville, Ill., for four years, and has levoted the past two years to studies of plant ecology as a fellow in the botany department of the University of Chicago.

Richard F. Hammatt has resigned as secretary of the California Redwood Association and is returning to the United States Forest Service as chief of public relations in the Northern Region, with headquarters at Missoula, Mont. Mr. Hammatt, who is a forestry graduate of Harvard University, was formerly connected with the Forest Service from 1906 to 1921. He was supervisor of the Shasta National Forest, Calif., from 1910 to 1918, and from 1918 to 1921 was in charge of public relations work in the California Region.

Elliott S. Barker is now game warden of New Mexico. Mr. Barker was a member of the United States Forest Service from 1909 to 1919, serving during the last part of that period as supervisor of the Carson National Forest, N. Mex.

A. D. Read, formerly forester for the Long-Bell Lumber Co. at De Ridder, La., is temporarily connected with the Texas Forest Service. He is collecting data required for the preparation of forest type maps of the four Texas State forests.

Officers elected for the coming year by the Botanical Society of New Orleans are Miriam L. Bomhard, of Newcomb College, president; William T. Penfound, of Tulane University, vice president; Philip C. Wakeley and L. J. Pessin, of the Southern Forest Experiment Station, secretary and treasurer, respectively.

Fred W. Fletcher has been appointed instructor in the department of entomology, New York State College of Forestry, to fill the vacancy created by the resignation of R. L. Taylor. Mr. Fletcher received the A. B. degree from Miami University in 1927 and the M. A. degree from Ohio State University in 1929, and has nearly completed the requirements for the doctor's degree. He has had two years' teaching experience and has had three summers' field experience with the United States Bureau of Entomology.

Bert R. Lexen has left the Washington (D. C.) office of the United States Forest Service to attend the summer session of the Iowa State College of Agriculture, where he is registered for courses under R. A. Fisher, of the Rothamsted Agricultural Experiment Station, England. In the fall Mr. Lexen will report for duty as forest mensurationist at the Southwestern Forest Experiment Station.

Foster Steele, of the Cascade National Forest, Oreg., has been promoted from the position of fire assistant to that of assistant supervisor.

A. G. Angell, fire assistant on the Whitman National Forest, Oreg., has been promoted to the position of assistant supervisor of the Deschutes National Forest, Oreg.

James P. Farley, junior range examiner on the Sequoia National Forest, Calif., has been transferred to the Lassen National Forest, Calif., as assistant supervisor, Ralph S. Hosmer, head of the Cornell University department of forestry, has been appointed by Conservation Commissioner Henry Morgenthau, jr., as a member of the advisory council of the New York State Conservation Department.

A. W. Hartman, who has been handling timber-sale work on the Ouachita National Forest, Ark., is being promoted to the position of assistant supervisor of that forest, succeeding R. M. Conarro. Mr. Conarro is being transferred to the Cherokee National Forest, Tenn., as assistant supervisor.

Lester Moncrief has been transferred as assistant forest supervisor from the Umatilla National Forest, Oreg., to the Columbia National Forest, Wash. succeeds J. M. Mann, now superintendent of road c struction on the Columbia.

Hugh P. Baker, dean of the New York State Coll of Forestry, has been appointed a member of Charles Lathrop Pack Forest Education Board.

Robert Oliver Sweezey, president of the Beauharn Power Corporation, is president of the Canadian F estry Association this year.

James L. Averell, of the staff of the Southern For Experiment Station, will enter the University California in August as Baker fellow in forestry.

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Softwood Resources of the World

By W. N. Sparhawk, United States Forest Service

Streyffert's monumental work [3] on the world's softwood timber resources is a most valuable and timely contribution. It gives the most recent available information, by continents and by individual countries, on the character and extent of softwood resources and the production, consumption, exports, and imports of sawed lumber, round timber, pulp, paper, and other products. For many countries the statistics include data for 1929; for some, 1930 figures are given. It is interesting to note that in the period 1925–1927 North America, with 40 per cent of the world's area of conifer forests, produced 54 per cent of the 64,000,000,000-foot average annual softwood lumber output of the world and that Europe, with only 18 per cent of the area, produced 34 per cent of this output.

The volume of international trade in sawed softwood lumber has trebled since 1880. In 1927 the countries producing such lumber exported 22 per cent of the softwood cut. Sweden's share in the exports decreased from 24 per cent in 1880 to 13 per cent in 1927, while the United States' share increased from 5½ to 17½ per cent. Great Britain took 50 per cent of all the imports in 1880 and only 28 per cent in 1927. In the latter year the United States and Germany took 11 and 10 per cent, respectively. For Europe as a whole softwood imports exceeded exports until 1925, but since then exports have taken the lead.

The world production of wood pulp increased from 6,966,000 tons in 1911 to 16,763,000 tons in 1929. During this period the output of the principal producing countries increased as follows: Japan, 757 per cent; Canada, 688 per cent; Finland, 375 per cent; Sweden, 165 per cent; Norway, 94 per cent; the United States, 71 per cent; and Germany, 68 per cent.

In 1927 Sweden, with 2 per cent of the worl conifer forests, produced 4 per cent of the softwo lumber, 8 per cent of the mechanical pulp, and 19 p cent of the chemical pulp. The United States, wi 11½ per cent of the forests, produced 45 per cent the lumber, 24 per cent of the mechanical pulp, and per cent of the chemical pulp.

Following a comprehensive summary of the wor situation, the author concludes that there is no reas to anticipate a decrease in the world's softwood r quirements; that, on the contrary, the demand likely to increase. Because of the higher prices th will ensue, together with better utilization and wit increased yields resulting from forest managemen softwood forestry is bound to be reasonably profitab in the long run.

The value of the book is greatly enhanced by nume ous graphs and excellent photographs. It is to b hoped that an English edition can be published in th near future.

Lumber Production and Wood Utilizatio in Southeastern Minnesota

By W. D. Brush, United States Forest Service

Results of a survey of the use of wood in manufac ture which covered 14 counties of Minnesota have bee published by the University of Minnesota Agricultura Experiment Station in a bulletin by L. W. Rees entitle "Lumber Production and Wood Utilization in Southeastern Minnesota."

A short account of lumber and tie production particularly applicable to small timber holdings includes information on charges for sawing lumber and costs of producing ties in the region. The greater part of the bulletin is taken up with a presentation of consumptio data for 1927 on the wood-using industries of southeastern Minnesota. Tables show wood consumption by kinds of wood, for the section and for each class o wood-using industry in the section, indicating what portions of the wood consumed were and were not

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[3] Streyffert, Thorsten: Världens Barrskogstillgånger. 780 pp. Svenska Skogsvårdsföreningens Förlag (Swedish Forestry Association), Stockholm, 1931.

wn within the State. Wood grown outside the
te is shown to have made up about 80 per cent of
quantity consumed in the counties covered by the
dy. Evidently there is much need for encouraging
growing of timber on rugged areas of this section
t are not adapted to cultivation. The secondary in-
stries of this region are shown to have used about
,000,000 board feet of wood in 1927, exclusive of
quantities used for cooperage. Lumber production
the same counties in 1928 is reported as 6,178,300
rd feet. This indicates that a large part of the raw
terial for these secondary industries is used in the
or bolt form. Brief recommendations in regard to
rketing woodland products give the comparative
vantages of several selling methods.

Although there is much information in this publica-
n that will help the small timber owner of the region
locate a profitable market for his products, it seems
t its value would have been greatly increased by
addition of more detailed and specific data, includ-
information on the kinds of wood in particular
mand, the most desirable forms for marketing, and
s of prospective purchasers.

The World's Hardwood Supplies

By W. N. Sparhawk, United States Forest Service

In a recently published survey [4] of the world's
rdwood resources in relation to Germany's require-
nts, Arnim Lühdorf points out an important dif-
ence between the softwood and the hardwood situa-
n. With softwoods, consumption exceeds growth,
d the big problem is to prevent depletion; on the
her hand, there are vast undeveloped supplies of
rdwoods in the Tropics, and the most pressing
oblem with these is to increase consumption.

In order to build up a demand for tropical woods
the industrial countries, several measures are
sential. The tropical forests must be studied so
to ascertain what kinds of useful woods are avail-
le in sufficient quantities to insure steady supplies.
he present confusion in trade names must give way
a standard nomenclature. Methods of exploitation
ust be made more efficient, and the industry must
adequately financed and organized on a stable
sis. All exploitation should be under supervision
a trained forest service in order to insure perpetua-
on of the resource. Producers must cooperate; they
ould preferably market their timber through a com-
on selling organization, thus enabling customers to rely
pon steady, adequate supplies of the desired kinds of
ood such as production by individuals can not insure.

Germany imports most of her hardwoods through
e ports of Rotterdam, Bremen, and especially Hamburg, which is the leading hardwood-importing center on the Continent. American dye and tanning extract woods began to come to Hamburg early in the sixteenth century; importation of American mahogany, cedar, and other cabinet woods started about 300 years later; and walnut, oak, ash, and hickory from the United States entered the market about 1850. Importation of African woods began about 1890 and that of Australian woods after 1900.

Since the war there has been a heavy decline in imports of American woods, except hickory. American oak is poorer in quality and much higher in price than formerly; better oak is supplied by Europe (Poland, Czechoslovakia, Yugoslavia) at lower cost. American mahogany is too expensive and now goes mostly to Liverpool, while Germany takes African mahogany and other less costly cabinet wood. Spanish cedar has largely been supplanted by African okumé for cigar boxes.

Germany's normal requirements for hardwoods are large and varied. In her own forests hardwoods compose less than one-fifth of the stands, their growth is relatively slow, their average quality is rather poor, and hardwood species are few. Although several European countries are now supplying excellent oak, their supplies are limited and are not likely to last. The United States can not be counted on as a future source of large quantities of high-grade hardwoods. The conclusion is that Germany, as well as other importing countries, will have to depend chiefly upon the tropical forests, and that for the near future, at least, Africa will be a more important source than South and Central America.

Effect of Soil Moisture on Spruce Reproduction

Discussing Yale School of Forestry Bulletin No. 26, The Effect of Soil Moisture on Spruce Reproduction in British Columbia, by Percy Munson Barr, A. C. Forbes has written in the Empire Forestry Journal as follows:

> The investigations were devised with the object of ascertaining the most favorable conditions for securing spruce regeneration in Canada and the United States in view of the importance of spruce in the manufacture of paper. The principal difficulty in Canada has hitherto been the succession of spruce by balsam or other silver fir species, and these offer ideal conditions for extensive outbreaks of spruce bud-worm. While seed supplies may be adequate, adverse conditions may exist on the forest floor for the germination and survival of spruce seedlings, and the bulletin deals with attempts to discover these.
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> The investigation was begun in 1924, when a number of permanent plots were laid out at the Aleza Lake Forest Experiment Station in the Upper Fraser River Valley. This station consists of 6,700 acres of rolling country, forming the watershed of a small unnamed stream, the bulk of which is heavily timbered with *Picea engelmannii* and *P. canadensis*, together with *Abies lasiocarpa*. The germination and survival of

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[4] Lühdorf, Arnim: Die Bedeutung des Handels mit aussereuropäischen
arthölzern, unter besonder Berücksichtigung der Stellung Hamburgs.
pp. Published by the author. Giessen, 1931.

spruce seed on raw humus and exposed mineral soils were investigated under four sets of conditions: (*a*) Surface undisturbed, (*b*) surface shaded, (*c*) surface watered, (*d*) surface trenched. Germination was found to be negligible on undisturbed raw humus, but took place freely on exposed mineral soil, and on the latter trenching to eliminate root competition did not produce any definite effect, although it was increased slightly on the humus. Increased shading reduced germination on both surface types. Germination was better on northern than on southern slopes, and artificial watering considerably increased germination on humus, but had little effect on natural soil. From these results it is assumed that the amount of available moisture was the deciding factor on all surfaces.

After spruce seedlings have become established their ability to survive dry seasons appears to be the same on either humus or mineral soil, but considerable mortality, due to disease, occurred in humus.

The general conclusions are that the failure of seeds to germinate on humus soil in the forest is due to their inability to absorb moisture from the particles of organic matter with which they are in contact. In the mineral soil this inability is not perceptible. Artificially breaking up the surface and exposing the mineral soil is assumed to be the remedy for failures in restocking. A similar remedy is probably applicable to most coniferous regeneration in old woodland where the humus layer is old and tough, and has become dry, and decomposition into mild humus is a more or less slow process.

The author does not state the cause of death after germination, although it is assumed to be lack of moisture in most cases, aided by attacks of birds and insects.

An International Address Book of Botanists

By E. D. MERRILL, New York Botanical Garden

At the final plenary meeting of the Fifth International Botanical Congress, held at Cambridge, England, in August, 1930, it was unanimously resolved that an international address book of botanists should be prepared and published. To carry out this project a committee was appointed consisting of T. F. Chipp, assistant director of the Royal Botanic Gardens, Kew, England; L. Diels, director of the Botanic Gardens, Berlin-Dahlem; and E. D. Merrill, director of the New York Botanical Garden.

The most recent publication of this kind is Dörfler's Botaniker Addressbuch, of which the third edition appeared in 1909. The need of an up-to-date publication has been increasingly felt in late years, with the rapid growth of botanical science and the necessity for more general communication and cooperation among botanists in different parts of the world.

At meetings of the committee held in London following the conclusion of the congress it was agreed that the address book should, in general, follow the scheme of the current edition of Dörfler; that is, that countries should be listed alphabetically and that under the name of each country should appear, in the language of that country (in Roman characters), lists of institutions and societies wholly or in part botanical and a list of botanists in which the surname and initials of each individual should be followed by his degrees, office, add and special field of interest, "botany" being interpr in its widest sense.

The responsibility of collecting and collating necessary data from the various parts of the world assigned by agreement of the committee member follows: To Doctor Diels, central and eastern Eur the Union of Socialist Soviet Republics, and most of countries in South America; to myself, North Amer the West Indies, certain countries in South Amer Polynesia, and the Philippines; and to Doctor Chi the remaining countries. Each member of the comm tee was directed to obtain the services of such l collaborators as might be deemed necessary. In areas assigned to me the services of about 80 individ collaborators were obtained. Information as to Uni States Government employees in the botanical fi was handled by a special committee having as chairm William R. Maxon, of the Smithsonian Instituti The central committee is under very great obligation the numerous individuals who volunteered to assist obtaining the detailed data required.

All the data, covering more than 13,000 entries, w prepared on index cards, from which the printing will done direct. The final preparation of the material the printer was done at Kew. The data are now in t hands of the printers.

A special grant was received from the Carnegie Cor ration sufficient to cover the expenses of the cent office, and a loan from the Bentham Trustees to fina the actual printing. This financial assistance has ma it possible to sell the book at the low price of $3.25.

Orders for the book may be placed with the printe Messrs. Baillière, Tindall & Cox, 7 Henrietta Stre Covent Garden, London.

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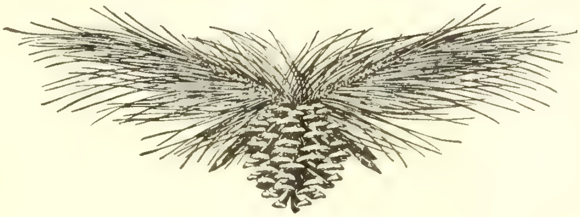

September, 1931

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Society of American Foresters Annual Meeting

The Society of American Foresters will hold its annual meeting in New Orleans, La., December 29, 30, and 31, in connection with the winter meeting of the American Association for the Advancement of Science. The opening session will be featured by a symposium on forestry in the South. Subjects on which talks are tentatively scheduled are the uses of aerial photography in forest mapping, aspects of the regional forest survey, the work of the Wisconsin Land Survey, erosion problems (discussed by a representative of the Bureau of Chemistry and Soils), the work of the Timber Conservation Board (discussed by the board's executive secretary), and the rôle of forest products in railroad revenue (discussed by the chief engineer of one of the southern railroads). An all-day field trip will be m to inspect the pine plantations, nursery, and sawmi the Great Southern Lumber Co.

Special railroad rates will be available to registra Those planning to attend should notify G. H. Le Southern Forest Experiment Station, 348 Baro Street, New Orleans, La.

Central States Forestry Congress

The Central States Forestry Congress, organized year at Indianapolis, will meet in Cincinnati Decem 3, 4, and 5. Alexander Thomson, of Cincinnati president of the congress. Communications in reg to the meeting should be addressed to the chairmai the program committee, C. Vivian Anderson, Un Trust Building, Cincinnati, Ohio.

The Forest Worker is published by the Forest Service, United States Department of Agriculture, Washington, D. C. Jean Kerr, editor. Material offered for publication in the Forest Worker should be addressed to the editor.

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FOREST WORKER

Vashington, D. C. SEPTEMBER, 1931 Vol. 7, No. 5

State Forestry

Forests in Southern Maine Now Protected From Fire

Forest fire protection activities have now been exended to 11 of the 16 organized counties of Maine, hich occupy most of the southern half of the State. revious to 1930, the State did not engage in such ctivities in any of the organized counties. These 16 ounties include approximately 5,000,000 acres of forest and classed as in need of fire protection. In those here protection has been instituted the State is aying the salaries of fire wardens and is dividing the ost of fire tools equally with the towns. The towns re paying local wardens and are meeting suppression osts. The Federal Government is cooperating in the ork.

In the unorganized counties forest protection work s handled by State officers exclusively, and is supported hrough a special 2¼-mills tax levied on all property in hose counties. In 1929 the proceeds from this levy mounted to $169,000.

For the past five years, forest fires in Maine have urned over only about 0.08 of 1 per cent of the proected area yearly.

Slash-Disposal Measure Enacted by Wisconsin

A Wisconsin law of 1931 requires that all slash up o 4 inches in diameter resulting from timber-cutting perations within forest-protection districts be disposed f to a width of 50 feet from the edge of the right of way of any public highway or common carrier railroad r from the center of any main branch or main line ogging railroad, and requires that large slash-covered reas be broken into blocks of not more than 640 acres each with firebreaks created by disposing of the slash to a width of 50 feet on each side of logging roads, logging spurs, portage trails, or other lines. It specifies also that slash must be disposed of to a width of 4 rods from the line of adjoining property bearing valuable forest growth.

The alternative methods of disposal for which the law provides are burning under permit, removal, and, in cases in which special authority is given by the conservation commission, lopping and scattering.

On cut-over areas this law requires the felling of all dead snags or stubs more than 8 feet high within the strips on which slash disposal is required and 4 rods beyond.

The law requires also that all slash resulting from clearing or brushing operations on the rights of way of public highways or public utilities within forest-protection districts be burned.

The slash disposal required is to be carried out concurrently with cutting or within a period to be determined by the State conservation commission, not exceeding one year. If agencies cutting timber fail to dispose of slash according to law the conservation commission may do the work and charge the cost against them.

Michigan Takes Stock of Results from 30 Years of State Forestry

Now that Michigan has been active in reforestation work for nearly 30 years, arrangements are being made for a checking over of the State's forests and forest-land affairs. A resolution adopted by the conservation commission June 12 requested that the chairman appoint a committee to inquire into the results of the reforestation work carried out by the State thus far and to recommend any needed modifications in plans and procedure. Those appointed by Chairman W. H. Loutit to form such a committee are Raphael Zon, director of the Lake States Forest Experiment Station; Samuel T. Dana, dean of the School of Forestry and Conservation, University of Michigan; P. A. Herbert, professor of forestry, Michigan State College of Agriculture; Harold Titus, member of the Michigan Conservation Commission; Earl W. Tinker, regional forester, Lake States Region; P. S. Lovejoy, in charge of technical operations for the Michigan Department of Conservation; and Marcus Schaaf, State forester of Michigan.

* * *

Oregon land classified for reforestation under special forest tax legislation has reached a total of 280,000 acres. In Clatsop County alone 108,000 acres, or more than 25 per cent of the county's area, has been classified.

Progress Report on Pennsylvania Plantations

Having made a special study of 106 forest plantations in 18 counties of Pennsylvania, George S. Perry and C. A. Coover, of the State's forest-research institute, have stated their tentative conclusions from the study as follows:

In the State as a whole the worst obstacle to successful establishment of forest plantations has probably been rank-growing weeds, such as goldenrods, or dense and tall growing grasses, such as timothy. Because of competition from such weeds and grasses, the poorest results from forest planting are usually shown by the most fertile and moist portions of the areas planted. Where forest planting has failed from this cause, large transplant stock should be carefully set out in large holes after the sod or roots have been stripped from a space about 2 feet square at each fail spot. District Forester Shirey suggests that a square yard of strong building paper be fastened around each of the trees used in reinforcing such fail spots, stones or earth being used to hold the paper in position.

In northwestern Pennsylvania and near Gettysburg, in Adams County, where the soil is fine, newly planted trees have often suffered severely from frost heaving. Fall planting should never be attempted on such sites. In Erie County very good results have been obtained when the soil has been drained by plowing rather shallow furrows and trees have been set on the edge of the furrow.

Trees of several species, including northern white pine and Norway pine, have shown remarkable persistence when planted under brush and broken natural forest cover. District Forester Dague has demonstrated in Clearfield County that "while there is life there is hope" for Norway pine, so far as suppression by shade is concerned. Cutting to liberate plantings of Norway and northern white pines has been justified by results. In general, care and attention given plantations during their first five years has been well repaid.

No really successful plantings of ash or oak have been studied.

Shortleaf pine shows very good results where planted in southeastern Pennsylvania and as far north and west as Williamsport.

Japanese black pine is apparently not suitable for forest planting in Pennsylvania. Japanese red pine grows thriftily but is almost universally multiple stemmed. Those few trees that have a single stem show excellent growth. It is hoped that with superfluous boles pruned away in early life the tree will prove to be a good grower and well adapted to the soils and climate of Pennsylvania.

Except where naturally propagated trees or brush are present, spacing wider than 6 feet does not seem advisable for any tree. Northern white pine, especially, requires close spacing for good growth. All the best plantings of this tree were spaced 4 by 4 feet; the leas successful one was spaced 10 by 10 feet.

White pine weevil is the worst insect pest afflictin planted forests in Pennsylvania. It seems to do muc less damage in close-spaced than in wide-spaced plan ings. It sometimes attacks Norway spruce as severel as northern white pine and in some places does seriou injury to Scotch, Japanese red, jack, and even shortlea pine. This insect, except in one or two plantings appears to be far less prevalent in 1931 than in 192 and 1929. Sawfly larvæ have done considerabl damage to the larches and hard pines. They seem t do greater injury at higher elevations and in portions o the State having a moist, cool climate. A planting o jack pine along the Frankstown Road near the summi of the Allegheny Mountains was wiped out by sawfly attacks.

The best-growing tree found was a European larch in a mixture of that species with northern white pine at Lucullus, Lycoming County. Planted in 1912, it is now 46 feet tall and 8.2 inches in diameter at breas height. The greatest height growth found to have been made in a single year was that of a northern white pine in the York Water Co. plantations near Jacobus York County, which grew 5.4 feet during the 1928 growing season.

Messrs. Perry and Coover point out that these preliminary deductions are subject to revision in the light of further study of their data.

New York Plants 15,000,000 Trees on Newly Acquired State Land

Forest planting operations were carried out by the New York Conservation Department this spring on 30 separate tracts of land newly acquired by the State. The total area of these lands is 18,390 acres. The area actually planted, which includes all portions that were not already wooded and that were found to be adapted to reforestation, was 11,400 acres. More than 15,269,000 trees were used.

The cost of having the trees planted, by crews working under the five district foresters, varied by districts from $7.43 per 1,000 to $3.73 per 1,000. Where it was possible to use tree-planting machines the cost was only $2.80 per 1,000, compared to $5.84 per 1,000 if the planting had been done by hand. The State's labor bill was approximately $70,000 for the season's planting; in one week it reached a peak of $18,000.

* * *

On June 1 New Jersey opened to the public a park of 728 acres located in Salem County, about midway between the towns of Bridgeton and Vineland, known as the Parvin State Park. The tract is for the most part well stocked with old-growth oak timber and includes a 130-acre lake. Present options and contracts allow for enlarging it to 1,000 acres.

eorgia Creates Department of Forestry and Geological Development

Georgia has united its forestry and geology work nder a commission of seven members, of which the overnor is chairman ex officio. A change has been ade also in the method of financing the forestry work. eretofore supported with funds brought in by an cupational tax on lumber operations, State forestry tivities are now provided for through direct appropri- ion. For each of the calendar years 1932 and 1933 appropriation of $30,000 has been made.

A special appropriation of $40,000 has been made to e department of forestry and geological development supplement an offer of the Chemical Foundation of ew York to supply $50,000 worth of equipment for a micommercial pulp mill to be used for research. xperiments will be made to determine the pulp-mak- g possibilities of all pines and certain hardwoods ative to Georgia. This research will be directed by harles H. Herty, industrial chemist, who is a native f Georgia.

Texas Protection Area Now About 810,000 Acres

A seventh forest-protection unit has been formed in exas, the Angelina County Lumber Co. and the Frost umber Industries having entered into agreements with he State forest service for cooperative protection of 0,000 acres of timberland in Angelina and southeastern acogdoches Counties. About 10,000 acres of this rea is being made a part of protection unit 2. Alto- ether the seven units include about 810,000 acres.

Records for the calendar year 1930 show that approxi- ately 3.1 per cent of the forest protection area of exas was burned over in that year. Incendiarism was eld responsible for 38.6 per cent of the area burned, nd smokers for 35.7 per cent.

outh Carolina to Extend Forest Protection and Introduce Forestry in Schools

South Carolina's forestry plans for the coming year nclude the organizing of three new protective associa- ions controlling a total area of 115,000 acres before the eginning of the next fire season. Two steel lookout owers are to be erected on the property of existing ssociations. It is expected that more than 1,500,000 ree seedlings will be shipped from the State forest ursery during the coming winter.

Management plans have been prepared by the State orestry staff for 46 school demonstration forests, one each county of the State. The plans involve plant- g, thinning, improvement cutting, measures to pre- ent erosion, and fire protection. Students in the vocational agricultural schools will carry out these management plans and will also collect forest tree seed and plant it in nursery beds.

As a forestry text to be used in the vocational agricultural schools State Forester H. A. Smith plans to bind 10 selected Federal and State forestry bulletins together with an outline of 18 lessons based on portions of these bulletins.

A forestry program for 4-H club boys has been prepared and will be followed out in two counties during the present year preparatory to its final adoption throughout the State.

Fire Protection Effective on Michigan State Parks

Only one forest fire has occurred on the State parks of Michigan since they were organized, states an August, 1931, report of the Michigan Department of Conservation. That one occurred on the Marquette Park, and is believed to have been of incendiary origin. At the Hartwick Pines State Park, containing one of the two remaining virgin pine plots in the Southern Peninsula, no smoking is permitted, and a firebreak surrounding the pines is patrolled constantly. At Dodge Brothers Park No. 5, at Commerce, an area planted with pines in 1927 is closed to the public. Three of the larger parks have fire towers, and all those containing timber stands of any consequence are equipped with telephones. In most of the parks no open camp fires are permitted, and in the others camp fires are permitted only on beaches or in open spaces designated by the department.

❧

A new forest fire protection district is being organized in Jackson, Washington, and Scott Counties, Ind. According to the 1925 Census of Agriculture these counties contain 210,200 acres of idle or fallow land, woodland pasture, and woodland not used for pasture.

❧

Completion of a 100-foot steel lookout tower in Columbus County, N. C., about 1 mile east of Chadbourn on State Highway No. 20, adds the twenty-second link to the State's proposed primary detection system of 125 towers. The site for the tower was given to the State by C. R. Bailey, of Chadbourn.

❧

The second 100-foot steel lookout tower completed this year by the Maryland Department of Forestry was ready for service in July, near Quantico, Wicomico County. Woodland owners in the vicinity contributed $375 toward the cost of the tower. The Wicomico County commissioners contributed $300 and the use of tools and machinery.

Southern Cypress in Pennsylvania

A southern cypress (*Taxodium distichum*) 30 inches in diameter and 50 feet tall is growing on the Leonard farm a mile west of McAllisterville, Juniata County, Pa., reports Assistant Forester J. C. Kase, of the Bald Eagle forest district. The tree was planted in 1861 when the homestead was established, by a Mr. Leonard who traveled extensively through the South. Growing on the bank of a small stream, it has produced numerous knees 6 to 12 inches in height. This cypress is in a healthy condition, produces a bountiful crop of cones annually, and has withstood the rigors of the drought.

Other trees of the Leonard farm collection are a yellow-wood (*Cladastris lutea*) 16 inches in diameter, an umbrella magnolia (*Magnolia tripetala*), a coffeetree (*Gymnocladus dioicus*), and a fine specimen of Nordmann fir (*Abies nordmanniana*).

◆

With a view to determining in what parts of Texas slash pine may successfully be planted, the Texas Forest Service has offered to supply timberland owners with free stock for planting this winter. The trees will be ready for planting about November 15. The maximum number to be given to an individual planter is 6,000. Additional quantities of slash pine, as of longleaf, loblolly, and shortleaf pine, may be purchased from the State for reforestation planting at the rate of $5 or less per 1,000 trees.

◆

Twenty-one Vermont municipalities planted a total of 228,200 trees in the spring of 1931, the State forest service reports.

◆

Forest trees distributed from New York's State nurseries in the spring of 1931 totaled about 33,000,000. Of this number 18,000,000 went to counties, organizations, and individuals.

◆

Trees shipped from Ohio's State forest nurseries in the spring of 1931 totaled 3,569,855, setting a new record for the State. About half this number went to farmers, and 1,031,927 were planted on State lands.

◆

New Jersey added 1,690 acres to its State forests in the quarter ending June 30, 1931. Income from the State forests for that quarter was $5,430.

◆

On August 1, registrations of this season at 18 of the principal free public camp sites maintained by New York State in its forest preserve totaled 241,134.

New Jersey Transplant Digger

A sweetpotato digger has been adapted by the Ne Jersey Division of Forests and Parks for use in fore nurseries as a transplant digger. The machine is ve similar to the ordinary 2-horse agricultural plow. T top half of the moldboard has been removed order that instead of turning the plants under th soil the plow may merely throw them above th surface. The distance from point of share to bear also, is about 8 inches greater than on the ordinar plow, enabling the operator to plow at a depth as grea as 20 inches. The land side on the digger is 6 inch longer and 2 inches narrower than on the ordinary plow With this digger it is possible to lift 10,000 transplan in 20 minutes.

Some of the adaptations of this machine we worked out by E. D. Anderson, of the State divisio of forests and parks.

New York Plans to Rear Many Quail

Plans have been adopted by the New York Conservation Department for large-scale propagation of nativ quail to restock the covers of the State. An incubator brooder plant for propagating both quail and pheasant is to be developed at the State game farm at Middl Island, Long Island, heretofore used for propagatin pheasants by the "range" system, in which chicke hens are used to hatch and brood the pheasants. Mor than 3,000 quail of the variety native to the State ar being liberated this year. In previous years the conservation department has tried to increase the State's supply of quail by liberating trapped wild birds of th Mexican variety, but without satisfactory results.

The four New York State game farms this yea obtained more than 200,000 eggs from their stock o pheasants. Approximately 40,000 eggs were set fo hatching on the farms. The remainder were distributed to sportsmen's clubs and farm boys and girls who undertook to rear and liberate pheasants. More than 1,300 4-H club members received eggs and reared an average of 10 birds each to an age suitable for liberation, receiving $1 for each such bird.

◆

Seventy citizens of Butte, Mont., mostly members of the local Rotary and Kiwanis Clubs, have volunteered to serve as State fire wardens and have been appointed as such by State Forester Rutledge Parker. Their duties are to report forest fires and violations of State or Federal forest fire laws and to warn persons found building fires in unsuitable places or leaving fires unattended.

◆

An unusually good crop of longleaf pine seed is in prospect in Georgia this year, the State forest service reports.

Education and Extension

rmers' Cooperative Does Good Business in Forest Products

The woods products department organized by the rmers' Federation of western North Carolina in uary, 1930, reports that in the year ending June 30, 1, it shipped 275 carloads of forest products. This antity included no chemical wood; the federation's pments of wood of that type, though heavy in the ing of 1930, were discontinued at the end of six nths for lack of demand. Shrubbery business owed a slight gain in the spring of 1931, with the pment of 26 carloads.

The department is now working out a plan whereby will be enabled to give seedling trees of pine and plar and perhaps other woods to farmers who will dertake to plant and care for the trees and devote em to the development of salable timber.

Profitable Woodlands on Ohio Farms

Maple sirup from a grove owned by A. C. Beales ar Burton, in Geauga County, Ohio, has brought in gross revenue averaging more than $1.28 per tree per ar for the past 20 years, Extension Forester Forrest . Dean reports. In that time the 350 maples tapped ve yielded 6,000 gallons of sirup, for which Mr. eales received $9,000. The trees are still in excellent ndition for producing sirup as well as wood.

Selection cuttings on a 20-acre farm woodland owned a Mr. Wilcox, in Huron County, have brought a oss return of more than $1,000 in 10 years, leaving e most salable products in the woods. The Hatha-ay woods, a 30-acre area in Seneca County stocked ith white ash, elm, red oak, sugar maple, basswood, nd beech, which is valued at $4,000 or more at present arket prices, has been the source of an income of 1,100 to its owner during a period of eight years rough selective cutting of timber.

In addition to salable products, all these woodlands ave been providing fire wood and building material r use on the farm.

When Mr. Dean laid out improvement-cutting plots even-aged 60-year-old second-growth timber of ixed oaks, tulip poplar, and chestnut on a portion of he old Jefferson charcoal furnace lands, in Jackson County, he found that 25 oaks and chestnuts per acre ould be removed with an average cut of four railroad ies per tree, leaving the bulk of the growing timber n the ground to develop into saw logs. The 200-cre woodland on which the plots were laid out was urchased 35 years ago by the present owner, a Mr. Gillen, for $3 per acre. During 1929 Mr. Gillen was offered $15,000 for the timber alone. He rejected the offer, preferring to cut the timber himself on a selection basis, making use of his team and equipment in producing railroad ties and hauling them to market.

Tree Planting in Nebraska

By Clayton W. Watkins, Extension Forester of Nebraska

Although Nebraska is classed as a Plains State, and 50 years ago could boast of very few trees except along streams, approximately 6,000,000 trees are planted in the State each year for windbreaks, woodlots, parks, and land reclamation. From the very beginning of Nebraska's history trees have played an important part in the State's development, and to Nebraska statesmen goes considerable credit for some of the early national forestry legislation. It was natural that Arbor Day should originate in a State where its benefits would be most helpful; but the fact that Arbor Day observance has spread over the world is something in which Nebraska takes a great deal of pride. The Hon. J. Sterling Morton, founder of Arbor Day, established a living memorial in the trees which he planted on the grounds of his Nebraska city home, now maintained as a State park. This and many other early plantings have served as demonstrations inspiring others to improve their home surroundings.

Not a small part of Nebraska's annual tree-planting program is the planting of windbreaks and woodlots by farmers in cooperation with the Agricultural Extension Service. In the spring of this year, 975,000 forest-tree seedlings and transplants were distributed for this purpose under the terms of the Clarke-McNary law. This cooperative planting has been growing since it was started in 1926. While some sections of the State have experienced adverse conditions during the last four years, in general the results are satisfactory. The survival for the 5-year period ending with 1930, as shown by reports from cooperators and field inspectors, was 52.3 per cent. This covers both evergreen and deciduous species.

Clarke-McNary stock is distributed about April each spring. While any number of trees from 100 to 1,000 may be applied for, the average is about 300 trees to a planting. Records show that a large number of the cooperators plant every year. Considerable time and thought are being given to farm-home beautification and development in Nebraska. Many counties are conducting definite programs with home improvement as a goal. This type of work sometimes fails to show immediate results, because of the comparatively slow growth of some plants and because of seasonal setbacks; but a 10-year program will show a general improvement. Further, there is no danger of overproduction in a project of this kind, and since the expense for plant materials is so slight anyone can take part.

Nebraska is living up to her name "The Tree Planters' State."

Nebraska Evergreens Injured by Sharp Drop in Temperature

Planted evergreens in Nebraska have suffered severe damage as a result of a blizzard that occurred on March 26 and 27 of this year following an unusually mild winter, writes Extension Forester Clayton W. Watkins. Plantings of blue spruce, Douglas fir, western white spruce, lodgepole pine, and jack pine inspected by Mr. Watkins were completely defoliated. "In general the damage seemed to be to the leaves and buds which had begun to open, with little noticeable damage to twigs. Trees that were protected from the north and west suffered most in some cases, because this protection had stimulated early growth. Small newly-planted trees that were not fortunate enough to be covered with snow at the time of the storm suffered more damage than the older trees which were well established. In a few cases entire plantings of young evergreens were killed."

The trees affected had experienced lower temperatures during every winter of their lives except the last and had come through with normal health, declares Mr. Watkins; the injury was due to the suddenness of the change in temperature at a time when warm weather had prepared the trees to begin a new season's growth.

❦

If North Carolina woodlands were thinned as they should be 50,000,000 cords of wood would be removed from them immediately, declares Extension Forester R. W. Graeber. Mr. Graeber estimates that farmers of North Carolina now use about 4,800,000 cords of fire wood annually, this quantity including 1,500,000 cords used for curing tobacco. He advocates increased use of fuel wood not only by farmers but by industries, schools, and other agencies.

❦

A plan approved by the trustees of the New York State College of Forestry calls for combining the departments of forest recreation and landscape engineering to form a department of forest recreation and park engineering.

❦

A course in conservation of natural resources is newly offered this year by the department of forestry of St. Lawrence University, Canton, N. Y. Floyd M. Callward, professor of forestry, will conduct the course.

North Carolina Sawmill Schools

Four "sawmill schools" held at scattered point western North Carolina in July, 1931, by arrangen of county agents and Extension Forester R. W. Gra were attended by nearly 350 sawmill operators, logg and timber owners from 15 counties. Attendanc individual meetings ranged from 51 to 125. meetings, lasting one day each, were held at the of J. E. Thompson & Co., Hallsboro, Columbus Cou at Bob Howell's sawmill, Troy, Montgomery Cour at the lumber plant of the Snuggs Lumber Co. the logging and milling operation of Watt Green, O boro, Stanly County; and at the plant of the Ler Lumber Co., Lenoir, Caldwell County.

C. J. Telford, of the Forest Products Laborato told how lumber quality can be improved by m accurate sawing and stacking, and how blue stain be controlled. D. P. Price, sawmill expert with E. C. Atkins Saw Co., answered questions on n alignment, tension of saws, lead of the saw, etc. T Bearden, saw expert with the Atkins Co., dem strated filing and fitting a crosscut saw and staged log-sawing contest with eight teams of cutters. M Graeber took the men on woods tours to study tr growth, methods of cutting, and fire damage.

New Jersey 4–H Forestry Clubs Growi Rapidly

By E. L. Scovell, Extension Forester of New Jersey

Interest in New Jersey's junior 4–H forestry cl project continues to grow at a surprisingly rap rate. Our chief difficulty this past year has been provide local leaders and county supervision for ne groups which desired to join the ranks. We have r fused at least 25 groups their wish to be organiz into junior 4-H forestry clubs this past year, becau suitable local leaders could not be found or because was impossible to spread the county club agent time sufficiently to give these additional groups t supervision they needed to do effective club wor Never since the project was started in 1926 have w made an effort to solicit club membership.

At the present time (figures are quoted as of May 1931), 2,943 New Jersey boys and girls are members junior 4-H forestry clubs. They represent 61.1 pe cent of the State's total 4-H club enrollment in agri cultural projects, and about one-third of the total en rollment of both agricultural and home-demonstratio projects. Eleven of the nineteen counties in the Stat having county extension offices now are cooperating i this project, and in three additional counties demand for the project have come from the people.

We credit this rapidly growing interest in our forestry project first to the fact that there is somethin about the "woods" which appeals to boys and girls and secondly to the fact that instead of trying t teach boys and girls something which we wished them learn we took great care to find out what in the oods" particularly interested each boy and girl d then helped them to find greater satisfaction in rsuing that interest.

We realize that we are conducting an experiment. though our project has been making fine progress six years and we have learned much in those six ars, we comprehend the chance of encountering new d unlooked-for symptoms, and so reserve the experimenter's right of not offering a prophecy.

hio Trees Recover Well From Effects of 1930 Drought

Although forest trees planted in Ohio last year died large numbers as a result of drought conditions, ees established prior to that year have on the whole covered satisfactorily from the effects of the drought d have made normal growth this year, according to bservations reported by the forestry department of e Ohio Agricultural Experiment Station.

On trees of some species, growth was normal in 1930. ell established Norway spruce plantations in northern hio made normal height growth, although very young lantings of this species showed unusual mortality. oung plantations of Norway pine and Scotch pine howed little more than normal mortality, and plantations of these species made approximately average eight growth. In the spring of 1931 the growth of Norway spruce plantations which grew normally in 930 was apparently about normal, and Norway and cotch pines made fully average growth. Firs and emlocks produced a height growth greater than usual, nd larches grew very satisfactorily. Growth on ardwoods was about normal.

The forest plots and ornamental plants at the Wooster Arboretum showed more winter injury this spring than sual. As a partial explanation of this fact the station oints out that in 1930 the dry summer was followed by period of autumn rains, which stimulated plant growth t such a time that the trees had not yet become dormant when killing frosts occurred. In many cases severe injury resulted, which became more noticeable this spring when new growth started. Native deciduous shrubs showed this injury more than some of the evergreen ornamental specimens; the tips of their branches turned brown and died, and in some cases the entire plant died.

The flow of sap of the sugar maple stands in northeastern Ohio was about half normal this spring; the quality of sirup produced was better than usual. Bloom on ornamental shrubs seemed to be more abundant than ever, and seed crops on trees producing seed early in the summer were very heavy. Some trees producing heavy seed crops showed a thin and late-developing foliage.

Unusually favorable conditions existing in the spring of 1931 are largely credited with the normal growth observed in Ohio in this postdrought year. Forest tree seedlings planted this spring have grown exceptionally well. A suggestion passed along by the experiment station is to the effect that the unusual dryness of the soil last year induced abundant root growth which enabled trees to make normal growth this spring.

Kansas Pasture Land Subjected to Burning Produces Less Vegetation Than That Not Burned

Five years' experimental burning of typically hilly bluestem pasture in eastern Kansas by the Kansas Agricultural Experiment Station has brought out evidence that burned pasture land yields less vegetation than unburned pasture. Different plots were burned at four different periods during the year—late fall, early spring, midspring, and late spring. The plot burned in the fall produced the least vegetation, and that burned in late spring produced the least quantity of weeds. Indications were found that in an average year the growth of vegetation begins slightly earlier on burned areas, but that in a cold, backward spring it is more advanced on unburned areas. Burning appeared to have little effect in the control of weeds and brush unless it was done as late as May 1. Burning late in the season showed a tendency to reduce the density of the stand of vegetation and increase the height of the top growth; it appeared, also, to encourage the growth of the coarser grasses. Little successional difference was observed in the vegetation on plots burned in early spring and midspring.

* * *

The southern forestry educational project conducted by the American Forestry Association in cooperation with the States of Florida, Georgia, Mississippi, and South Carolina was terminated June 30, 1931, at the completion of the 3-year program originally agreed upon.

* * *

A radio study group known as the Chaparral Club has been organized by the Conservation Association of Los Angeles County, Calif., primarily to develop interest in watershed protection. Regular broadcasts are made weekly, with naturalists as speakers, from a commercial radio station which gives this service without charge. Illustrated study leaflets on the more common trees and shrubs of the chaparral type are published by the conservation association and distributed free to members.

* * *

Ohio 4-H forestry clubs planted 225,000 trees this year. Thomas Funk, a Wayne County club member, set out in a nursery and in permanent plantings a total of 10,500 trees, of which 98 per cent were growing in midsummer.

Fire-Prevention Effort in Kalispell

How citizens of Kalispell, Mont., worked this summer to prevent forest fires is described as follows in an August 17 report by officers of the Flathead National Forest, which has headquarters in that place:

> During each period of extreme fire danger practically every business house in Kalispell is inserting fire slogans and warnings in all its advertising in newspapers, over the radio, and in the movies. In addition the broadcasting station (KGEZ) reads special notices, prepared by us, at frequent intervals during its 12 hours of broadcasting, so that there is a fire-prevention announcement about every 15 minutes.
>
> The owners of this station have offered us their facilities free of charge at any time, day or night, for as much time as we want. If it is after hours we have but to call the announcer and the operator and they will gladly go on the air. If we happen to be out of telephone communication with the field at any time, we can broadcast any important messages over station KGEZ.
>
> The management of one of the local garages prepared a special notice regarding the ax and shovel requirement, with a fire slogan, and had it mimeographed by the chamber of commerce stenographer. It is distributing this to all cars that enter the garage, attaching it to all work sheets, and mailing it out with statements. The banks, also, are mailing these notices out with their statements, and many other business houses mailing similar warnings with their monthly bills.
>
> The newspapers are using fire slogans for fil They have written several editorials and also sev front-page warnings for us.
>
> In Kalispell every time one picks up a local pa or attends a picture show he sees plenty of fire-prev tion pleas, and if one tunes in on KGEZ he can hea fire announcement at any time of the day.

* * *

The Duke Forest, Duke University, Durham, N. has been elected a member of the International Un of Forest Research Organizations. It is the seve institution in the United States to be admitted to union, which at the end of 1930 had 54 ordinary an associate members in more than 20 nations.

* * *

Correction: J. M. Tinker, and not Jack Thurmo as was stated on page 6 of the May, 1931, Fore Worker, is now one of two associate professors of fore try in the Georgia State College of Agriculture. M Tinker is a 1924 forestry graduate of the college. M Thurmond is district forester of the sixth district Georgia, with headquarters at Savannah.

Forest Service Notes

Eroded Old Fields as Forest Sites

By Charles R. Hursh, United States Forest Service

The forest productivity of abandoned agricultural fields has been the subject of much debate. Observations on the more mature old-field forest stands in the Appalachian Mountains indicate that many of these stands show a satisfactory growth during the first decade or two followed by a decidedly unsatisfactory growth at the period when ordinarily a stand should begin to put on a substantial annual increment. A possible explanation for this slowing down of growth of the old-field stands lies in the fact that practically all the abandoned fields have at some time suffered severely from sheet erosion. In the great majority of cases this was doubtless the reason for abandonment, the owners having concluded that the capacity of the land for producing agricultural crops was practically exhausted.

It is commonly believed that continuous cropping "wears out" land through the removal of soil nutrients by the crops. Only rarely does the landowner take cognizance of the fact that in many cases unproductiveness of the soil is really due to the sheet erosion and surface washing that follow continuous cropping. There is little doubt that on sloping lands in regions of even moderate rainfall the loss of soil nutrients through sheet erosion is many times greater than that incurre through removal of nutrients by the crops.

Preliminary examination of a number of old-fiel forest stands in the southern Blue Ridge Mountain has indicated that the rich surface soil from 4 to 1 inches in depth was completely removed before the lan was abandoned. As a result young trees becam established upon a soil horizon that was in reality subsoil possessing neither the desirable structura characteristics nor the available plant nutrients of th surface horizons that were lost through erosion during the period of cultivation. This subsoil is more aci than the normal surface horizons and contains no organic material.

No doubt much remains to be learned, also, about characteristics of root distribution and tree nutrition on eroded land and their effect on tree growth.

Old-field forest stands are becoming a factor in the forestry of the southern mountains and adjoining plateaus. Already considerable quantities of pulpwood are being cut from the shortleaf and Virginia pine stands that have become established on abandoned agricultural land in this region. In the plateau region abandoned fields may be considered potentially useful for growing timber for pulpwood, fuelwood, and farm needs. Each year much more land is abandoned than is cleared for agricultural use. Frequently this bandoned land is menaced by erosion, and partly on is account foresters are urging its utilization for tree ops. Before dependable predictions can be made to its productivity for such crops, however, it will necessary that more information be obtained as to e site characteristics of the abandoned fields.

oil Maps Used in Estimating Lake States Forest Type Areas

Soil maps of the Lake States, representing the results f work which soil surveyors of the Federal and State overnments have had in progress for the past 25 ears, have greatly helped the Lake States Forest xperiment Station in estimating the areas of different orest types in its territory. Soil maps are available or about 10,000,000 acres of the northern part of the ake States region. In the light of what the station as learned about relationships between soils and forest ypes these maps have effectively supplemented the esults of road traverses, making it possible to arrive at easonably accurate forest type area estimates with ittle expense of time and money. As a test of the ependability of this method, estimates of forest type reas thus arrived at for Ogemaw County, Mich., were hecked with data obtained by the Michigan Land Economic Survey through direct mapping of the county. The discrepancy between the two sets of figures was less than 3 per cent for all forest types but two, and was only 5 per cent for those.

On the basis of road traverses and soil maps the experiment station estimates the areas of different forest types in the Lake States as follows: Aspen, 22,320,000 acres; hardwood, 9,150,000 acres; oak, 8,550,000 acres; jack pine, 3,810,000 acres; Norway pine, 295,000 acres; white pine, 275,000 acres; ash-elm, 2,160,000 acres; cedar-tamarack, 4,710,000 acres; and spruce-balsam, 2,500,000 acres.

Air Drying of Cones Cuts Seed-Extraction Costs

Two weeks' natural drying of northern white pine cones as a preliminary to running the cones through a seed-extraction kiln resulted in a saving of $43 per 100 bushels of cones in a test carried out by the Lake States Forest Experiment Station. One hundred bushels of cones that were air dried yielded 23 pounds of seed before kiln drying and 37 additional pounds after 19 hours in the kiln. The same quantity of cones placed in the kiln without preliminary treatment required 125 hours' drying and yielded 67½ pounds of seed. The difference in yield is not considered significant. Neither lot of seed showed an advantage over the other in germination. The moisture content of the seed from cones that received preliminary drying was higher than that of the other lot but not high enough to affect the keeping qualities of the seed.

Recurrent Fires Menace Douglas Fir Reproduction in Northwest

Slash fires on recently cut-over Douglas fir lands very often spread to adjoining areas previously burned, with the result that much of the logged-off land has not merely one burning immediately after logging but one or two reburns within the space of a few years. Five years' observations by the Pacific Northwest Forest Experiment Station on 301 natural reproduction plots on 22 cut-over areas in various parts of western Oregon and Washington indicate that the rate of reburn is about 5 per cent per year. Of the 15 areas that were visited by a second fire, 12 had at least a light stocking of seedlings and some had as many as 2,000 seedlings to the acre; now the reburned portions of these areas, with one exception, are practically without seedlings.

Not only is existing reproduction on cut-over Douglas fir land killed by a second fire, but following a second fire the probability of satisfactory seedling reproduction is usually much less than it was following the initial burn; seed trees have diminished in number through death or windfall, the edge of green timber has receded as a result of continued cutting, and site quality has been lowered through destruction of humus and shade.

Douglas Fir in Colorado Injured by Winter Killing

A marked setback has been experienced by Douglas fir within the Pikes Peak region, particularly on the Fremont experimental forest, near Colorado Springs, as the result of extensive winter killing of shoots and frosting of buds during the late winter and spring of 1930. On two experimental plots approximately half the trees give every appearance of eventually succumbing to the injury or at least becoming stag-headed. As a rule new growth in 1931, even though very good on normally developing trees, on trees especially hard hit has been meager and has been largely confined to the lower branches. As the growing season began to wane the tops of a large number of the trees appeared to be dying. This winter killing was experienced uniformly by all age classes; if anything, it seems to have been most severe in thrifty, more rapidly developing individuals approaching maturity.

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An area of high and extremely rugged mountain country in the north-central portion of the Mount Baker National Forest, Wash., between the Baker and Skagit Rivers, has been designated as the Whatcom Primitive Area. It contains approximately 270 sections or 172,800 acres, of which approximately 22,000 acres is timbered, mainly with hemlock and true firs. Elevations range from 1,000 to 9,000 feet. Peaks abound, and the area is full of glaciers and rock masses.

Longleaf Pines Subjected to Thirteen Years' Light Burning Show Retarded Growth

By A. L. MacKinney, United States Forest Service

In order to determine how the growth of longleaf pine saplings is affected by annual controlled burning, still strongly advocated by many in the southern pine region as a means of forestalling disastrous fires and improving forest range conditions, experiments were started in 1916 at Summerville, S. C., by W. R. Mattoon and C. R. Tillotson. Fifty longleaf pine saplings, averaging 10 years of age and ranging from 1.3 to 9.3 feet in height, were tagged and measured on each of two contiguous areas. Since that time one of these areas, approximately 1 acre in size, has been burned over annually, and the other has been protected from fire with the result that it has not been burned except by one accidental fire of 1917.

The tagged trees were remeasured in 1919. All numbered trees that could be located were again remeasured in 1929 by C. F. Korstian and myself during the establishment of permanent sample plots on the burned and protected areas. At that time 29 trees were found still bearing tags on the annually burned plot, while on the protected plot only 16 tagged trees were identified.

Average values were computed for the diameter, height, and volume growth of these two groups of trees. Average height growth was computed for the 13-year period; diameter and volume growth were computed for the 10-year period 1919–1929 only, because diameter measurements were not taken in 1916. The significant data are presented in the following table:

	Year	Annually burned area	Protected area
Height (feet):			
Average	1916	5.0	6.1
	1929	29.9	37.1
Average total 13-year increment		24.9	31.0
Average annual increment		1.92	2.38
Deficiency on burned area		[1] .46	
Diameter at breast height (inches):			
Average	1919	2.57	2.63
	1929	5.47	5.82
Average total 10-year increment		2.90	3.19
Average annual increment		.29	.32
Deficiency on burned area		[2] .03	
Cubic volume peeled wood per tree (cubic feet):			
Average	1919	.204	.246
	1929	2.151	2.731
Average total 10-year increment		1.947	2.485
Average annual increment		.195	.249
Deficiency on burned area		[3] .054	

[1] 19 per cent. [2] 9 per cent. [3] 22 per cent.

Because so few trees were included in these sam it is of course possible that the difference in ave growth of the two groups is due to a factor or fac other than fire. This is unlikely, however, since p tically all the trees subjected to annual burning sho a lower height and diameter increment than the tr on the protected plot. Also, the difference of 22 cent between the average annual volume increm per tree on the burned area and that on the protec area appears large enough to be significant.

Stand tables for the two plots which were establis on the areas in 1929 show that at that time the annua burned plot contained only 61 per cent as many tr per acre as the protected plot. It is impossible to that this difference in number of trees did not exist the beginning of the experimental period; no data w taken on the number of trees per acre either in 19 or in 1919. However, in the 1916 establishment rep W. R. Mattoon stated that conditions on the t tracts were "quite similar." The present conditi of the unburned stands which surround the annua burned plot on three sides strengthens the belief th stand conditions on the two plots were comparable the beginning of the experiment.

It is believed, therefore, that the average height a diameter of the larger samples of trees measured 1929 on the burned and protected plots, totaling 1 and 222 trees, respectively, reflect the effects of annu burnings more accurately than the data for the tagge trees. The average diameter at breast height of trees on the annually burned plot was 4.4 inche while that of the trees on the protected plot was 5 inches. The contrast here is stronger than may first appear; the burned plot, having in 1929 a densit of stocking only about two-thirds as great as that o the protected plot, should during some part of th experimental period have excelled the protected pl in diameter growth if conditions had otherwise bee equal. The difference between the two plots i average height of trees is quite noticeable, 7.4 fee If the trees on the two plots had the same averag height at the time the burning experiment was starte those on the burned area have suffered a loss in average annual height growth of 0.57 foot per tree.

The volume of peeled wood in the stands on th two plots may be taken to represent a composite o the effects of fire on height and diameter growth. Pu on an acre basis, in 1929 the stand on the annuall burned plot contained 635.4 cubic feet, while that o the protected plot contained 1,306.1 cubic feet. If as seems likely, the two groups of trees had an eve start, the volume of wood produced on the burned plot falls short by 670.7 cubic feet per acre in 13 years, or 51.6 cubic feet per acre per year, of what it would normally have been.

Loblolly pine reproduction ranging from 1 to 14 feet in height occurs in an opening in the stand on the pro-ted plot. On the annually burned plot there is not ingle loblolly pine, although there is a hole in the nd comparable to the one on the protected plot. e annual fires have very effectively prevented the ablishment of any tree reproduction.

Litter and humus are absolutely lacking on the nually burned plot, while on the protected plot the mus is about one-half inch deep and the litter from o 5 inches deep.

The soil on the burned plot has a cover of grass with approximate density of 0.8. In contrast with this protected plot has no grass cover except in a small ening where the crowns of the loblolly pine reproction have not closed; the presence of litter and mus and the greater density of the crown canopy er most of the plot have prevented the establishent of grass and herbaceous cover.

eding Characteristics of Western White Pine

Whatever contribution tree seed stored in the duff ay make toward forest regeneration after logging in e western white pine type takes place in the first two ars following logging, according to findings of the orthern Rocky Mountain Forest Experiment Station. ith the exception of western white pine and possibly wland white fir, the seed of none of the species present as found to be viable in any considerable proportion ter one year's natural storage in the duff.

Cone-bearing western white pine trees killed by e as early in the season as June were found to mature nsiderable quantities of seed, though the seed from ch trees showed a lower viability percentage than at from normal trees.

Apparently good cones have been found on 10-yeard western white pines. Usually only three or four nes are borne the first year. The yield increases pidly up to the age of about 45 years. After that increases but slightly, and cones are borne only on e top of the crown even if the trees are open grown. wo pounds of seed is a heavy yield for a mature estern white pine, whereas a mature western yellow ine may in exceptional cases bear as much as 60 ounds of seed.

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Receipts from the national forests for the year endg June 30, 1931, are $4,992,945. This is $1,758,607 ess than the receipts for the preceding year.

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McHenry County, N. Dak., has bought 40 acres of and from the State and given it to the United States. The land will form the nucleus of an experimental forest which the Lake States Forest Experiment Station will se for planting investigations. The location is NW. ¼ NW. ¼ sec. 36, T. 156 N., R. 78 W.

Contract Awarded for Construction of Forest Products Laboratory Building

A contract has been awarded by the Department of Agriculture for the construction of a new building for the Forest Products Laboratory, at Madison, Wis., to be completed in one year. The contractors are C. B. Fritz & Co., of Madison. This is the principal award under a $900,000 Federal appropriation to provide adequate quarters and equipment for the laboratory. Established by the Federal Government 21 years ago in cooperation with the University of Wisconsin for the purpose of research directed toward better utilization of forest materials and broader markets for forest products, heretofore the laboratory has occupied buildings owned by the university. For several years its work has required a staff of nearly 200 and has taxed available facilities.

For the new building the University of Wisconsin board of regents has provided a 10-acre building site overlooking Lake Mendota and the university campus.

The building will have six stories and a total floor space of 175,000 square feet. In general plan it will be U shaped. The design is modern, with emphasis on vertical lines and with large areas of glass in the external walls. Construction will be fireproof throughout.

A large group of dry kilns equipped for close control of temperature, humidity, and air circulation will be provided, for seasoning many species and types of wood. There will be a cold-storage chamber in which green logs and timber can be kept in unchanged condition, ready for experimental use at any time, and a number of humidity rooms in which wood can be brought to the exact moisture content desired for study under conditions simulating those of any season of the year or any climate of the Temperate Zone. Machines for testing timbers and framework up to a breaking load of 1,000,000 pounds will be served by cranes in a testing gallery accommodating pieces and panels as large as 30 feet high and 100 feet long. A special moisture-control room served by movable machinery will make it possible to test boxes and shipping crates at any degree of dryness or dampness that would be met in service.

The pulp and paper research laboratory, occupying six floors at one end of the building, will include grinder equipment, a digester tower 40 feet square, beating and refining apparatus, and an experimental paper machine with all moving parts under precision control. Provision is made for a large timber-preservation laboratory, a wood-fermentation unit, fractionating stills, and a general section of wood chemistry; for wood gluing, painting, finishing, and fireproofing laboratories; and for facilities for studying wood fungi and insect pests and methods of abating damage from these causes. Among unusual features of the building will be an ultraviolet-ray chamber, where wood can be sterilized for mycological studies and where paints and other materials can be exposed for test; an X-ray room providing for examination of the minute structure and growth characteristics of wood; a microphotographic studio; and a stone table and shaft for ultracentrifuge apparatus to be used in determining molecular sizes of cellulose and other wood components.

Facilities planned to serve this establishment include a railway siding, a power plant of 630 boiler horsepower, and a number of service elevators, hoists, and monorails. Direct and alternating electric current at various voltages will be supplied to workrooms, and steam at high and low pressures will be piped to processing apparatus. Chemists' benches will be supplied with water, gas, compressed air, steam, and electricity. A forced ventilation system will be used for chemical hoods, pulp digesters, and other units as required. A sawmill, planers, and a complete woodworking shop will be available for preparing test material in all sizes, shapes, and forms of construction needed. A room will be equipped for barking, chipping, and grinding wood for experimental pulping and paper making.

Bark Thickness and Bark Volume of Western Yellow Pine

By Walter H. Meyer, United States Forest Service

Trees show peculiar differences when it comes to putting on a protective coating of bark. Some species have extremely thick layers and others have extremely thin ones. Bark thickness affects the art of tree climbing, as the poor wretch who has to do the climbing must allow for the thickness and scaliness of the bark by having sufficiently long spurs on his climbers. In the case of western yellow pine, for which a growth and yield study has been in progress for the past three years in the North Pacific Region, it has only lately been appreciated that the volume of the bark is equivalent to from 20 to 30 per cent of the actual wood volume, or that the thickness of the bark is from 12 to 18 per cent of the total diameter at breast height outside bark. Many such relationships were worked up as a necessary part of a study of the form and volume growth of western yellow pine trees involving measurements on almost 3,500 trees of all types and classes.

As the diameter of the tree increases the bark becomes thicker but forms a progressively smaller proportion of the diameter. The trend of bark thickness in relation to diameter shows no significant variation in any of the immature tree classes (1, 2, and 6) or the mature tree classes (3, 4, and 7) by Dunning's system. On the whole, however, the immature classes have slightly thicker bark, by a few tenths of an inch, than mature trees of the same size. The overmature trees, class 5, have materially thinner bark at breast height, in proportion to diameter, than any of the other classes. On the average the immature and mature trees have a 2-inch double bark thickness for a 12-inch breast-height diameter, increasing to a 5-inch double bark thickness at 40 inches, while the overmature trees have a 2.5-inch double bark thickness at 20 inches breast-height diameter running up to 4 inches at inches diameter. These trends and values, with m others, are shown in an office report titled "B thickness and bark volume of western yellow pin lately prepared at the Pacific Northwest Forest Exp ment Station as a by-product of the growth and yi study of this species.

A Little-Known Oak of the Southern Bottomlands

By Henry Bull, United States Forest Service

It seems remarkable that a distinctive species of o common throughout an important forest region of t United States could remain unclassified and apparen entirely unknown until as late as 1927. Yet if one we to go into the bottomlands of the lower Mississip River Valley (i. e., into the so-called Delta regions Louisiana, Mississippi, and Arkansas) armed with su formidable authorities on dendrology as the late (1926) edition of Sargent's manual, Hough's manu and Sudworth's latest check list (1927) and with va ous popular or semipopular bulletins describing fore trees of the Southern States just mentioned, he wou continually be confronted with an oak for which h armful of dendrology texts provided no descriptio The puzzling oak would be Quercus nuttallii (Palmer the original description of which was made by Erne J. Palmer of the Arnold Arboretum, Harvard Unive sity, in 1927, in the Journal of the Arnold Arboretu (vol. 8, no. 1). As yet no common English name ha become attached to this oak.

Quercus nuttallii was named in honor of the famou naturalist Thomas Nuttall (1786–1859). On one his trips through the bottomlands of Arkansas, Nutta listed Quercus coccinea, scarlet oak, among the tree seen. True Quercus coccinea is not found in th Arkansas bottomlands; evidently the tree referred t was that now known as Quercus nuttallii, which i certain respects is not dissimilar to Quercus coccine

Various English names have been and are applied t Quercus nuttallii, but none at present seems to be bot very distinctive and in general use. Lumbermen an loggers generally refer to it merely as red oak and d not separate it from others of the red oak group More specific but less widely used names includ smooth-barked or tight-barked red oak, striped oak (i allusion to the acorns), Red River oak (the tree is ver common in the Red River Valley in Louisiana), swam red oak, Mississippi Valley red oak, pin oak, and yellow-butt oak.

This oak is one of the most common trees on the low poorly drained clay (or occasionally loamy) flats and on the fairly well-drained clay ridges throughout the bottomlands of the lower Mississippi Valley. It probably never occurs naturally outside the bottoms. It is not usually found in permanent swamps and is never found in deep swamps. The flats on which it is most

undant usually have impervious clay soils that are
vered with water several inches deep throughout the
nter owing to the very slow, poor drainage and the
possibility of surface run-off of fall and winter rains.

The most common associates of the species are red
m, American elm, persimmon, green ash, red maple,
ercup oak, water hickory, water oaks (*Q. nigra* and
obtusa), hackberry, and hawthorn. Ordinarily
ercus nuttallii is not the principal species, from the
ndpoint of either number of trees or volume, in the
xed stands in which it occurs; but it is of extremely
le distribution, and at least several trees per acre
n be found on almost any poorly drained clay flat
low clay ridge within its extensive bottomland range.

The species is usually of medium size only, but in
gin stands it frequently attains a height of 100 to
0 feet with a breast-height diameter of 3 feet or more.
e bark of the trunk is very thin, close, hard, and
allowly fissured. Large trunks are usually strongly
ttressed. Quercus nuttallii belongs in the red or
ck oak group and its leaves, bark, and form often
ar a striking resemblance to those of pin oak (*Q.*
lustris). Usually, however, the leaves are not of
ch uniform width but are distinctly widest above the
ddle and taper sharply to a narrow wedge-shaped
se. The leaves are duller, also, and usually have
unter lobes and fewer bristle-tips than those of pin
k. The acorns are very distinctive. They average
inch in length and three-fourths inch in width
vice as large as acorns of pin oak) and are produced
rather deep cups that inclose about one-quarter of
e nut (in contrast to the shallow saucer-like cups of
n oak). Whereas Quercus nuttallii is extremely
mmon throughout the Louisiana bottomlands, pin
k probably does not occur south of the Louisiana-
kansas boundary. In east-central Arkansas, where
e two species occur together, it is often almost im-
ssible to distinguish between them in the absence of
e acorns.

Quercus nuttallii makes up a large part of the total
t of oak from the flats in the first bottoms of the
ississippi Valley Delta region. It is regularly cut
r lumber and is one of the few species of commercial
lue found on the low, wet clay flats. Usually the
ee reaches maturity in excellent condition but there-
ter degenerates very rapidly. Second-growth speci-
ens usually reach merchantable size (16 to 24 inches
ameter at breast height) in from 45 to 70 years and
this age are unusually sound and cut out with a
inimum of waste at the mill. Almost the whole vol-
ne cut is used for lumber, a small quantity going into
operage and tie stock. The wood is the reddest and
ost uniformly textured of the oaks found on low wet
es. It is heavy and hard. Like the wood of many
her oaks, it is inclined to check badly.

In future forestry practice in the southern bottom-
nds Quercus nuttallii should be of considerable im-
rtance, owing to its adaptability to sites usually too poor for the production of good-quality timber of other species, its consistently good reproduction, its fair to rapid growth rate, and its high average quality.

Poisoning Scrub Oaks in Western Florida

By E. W. Gemmer, United States Forest Service

One of the most conspicuous features of the landscape on the sandhills of west Florida is the dense stand of scrub oak. Turkey oak (*Quercus catesbaei*), bluejack oak (*Quercus cinerea*), post oak (*Quercus stellata margaretta*), and live oak (*Quercus virginiana*) occur as an understory in the virgin pine stands and with the removal of the pine become the dominating species. Once they are established it has seemed next to impossible to subdue them or replace them with longleaf pine. A study of the possibilities of poisoning these species was begun on the Choctawhatchee National Forest in September, 1930. Because of the great number of stems—trees 1 foot or more in height number from 5,000 to 25,000 per acre—spraying seemed to be the most practical method of applying the poison. The initial test was restricted to Quercus catesbaei, by far the most common species. Six well-developed sprouts 5 feet in height were selected and each was sprayed with one of the following solutions:

Copper nitrate, 62 grams in 350 grams of water.
Sodium chlorate, 113 grams in 470 grams of water.
Arsenic pentoxide, 37 grams
Sulphuric acid, 37 grams } in 330 grams of water.
Iron sulphate, 75 grams in 330 grams of water.
Sulphuric acid, 37 grams in 330 grams of water.
Copper sulphate, 62 grams in 350 grams of water.

Examination 24 hours after application showed that all sprays had caused injury to the leaves. The two copper compounds and the iron sulphate had turned approximately one-fourth to one-third of the leaves black. The arsenic pentoxide and sulphuric acid had turned all leaves a red-brown. Sulphuric acid alone had turned all leaves brown. Sodium chlorate had turned 90 per cent of the leaves brown. At the end of two weeks conditions were much the same. Trees treated with the copper and iron compounds were healthy, aside from the leaves injured within the first 24 hours. The leaves browned by the sodium chlorate and the sulphuric acid treatment were falling; the stems of the trees treated with these chemicals, however, were alive. Arsenic pentoxide had killed most of the stem, the leaves remaining fast to the branches.

In the spring of 1931 all but two of the trees looked normal. The tree treated with sodium chlorate showed some dead twigs and deformed leaves, but was rapidly recovering. The tree sprayed with arsenic pentoxide was completely dead. One small sprout had started from the stem of this tree and several from the root, but all had died.

On June 25, 1931, additional tests were made with the arsenic pentoxide and sulphuric acid mixture. Cuts from 3 to 8 inches long, penetrating the wood, were made in the stems by hacking with an ax, and the solution poured on the cuts. The following table indicates the results nine days after the poison was applied:

Species	Proportion of circumference girdled					
	Less than 50 per cent			More than 50 per cent		
	Dead	Injured [1]	Healthy	Dead	Injured [1]	Healthy
Quercus catesbaei	3	7	3	5		
Quercus stellata	4	6		1	1	
Quercus virginiana	2	5		1		
Total	9	18	3	7	1	

[1] Some of the trees classified as injured will unquestionably die.

The problem now appears to be one of developing a practical means of applying the poison. It is doubtful whether more than a few drops of the solution were utilized on the almost vertical cuts, the excess falling to the ground. If the incisions could be made so that greater quantities of the solution would remain in them for a sufficient length of time to be absorbed by the tree, the killing effect would probably be much greater.

Forest Road and Trail Systems

By G. H. Lautz, United States Forest Service

The forest road and trail systems which have been approved as necessary for the national forests during the next 10-year period consist in 82,393 miles of roads and 155,597 miles of trails. The road mileage includes 16,532 miles of forest highways and 65,861 miles of development roads. The former are roads which are of value to the national forests but of primary importance to States, counties, and communities. The latter are roads required for the administration, protection, development, and utilization of the national forests.

The forest highway mileage is represented at present by 6,122 miles of satisfactory roads, 9,048 miles of existing but unsatisfactory highways, and 1,362 miles of proposed construction. It is estimated that to bring the unsatisfactory roads into the desired condition and construct the proposed mileage will require expenditures totaling $189,100,890. This represents an average of $18,165 per mile.

The forest development system consists of 22,724 miles of satisfactory roads, 16,638 miles of existing but unsatisfactory roads, and 26,499 miles of proposed construction. The proposed reconstruction and construction will require $65,056,590, representing an average of $1,508 per mile.

The 155,597 miles of trail in the projected system is represented by 112,427 miles of satisfactory trails, 9,047 miles of existing but unsatisfactory trails, and 34,123 miles of proposed construction. To complete the trail system will require $5,497,990, which re sents an average of $127 per mile.

The total amount of funds required to complete road and trail systems which according to pres studies are required within 10 years is $259,655,470. transportation planning is completed upon one fo after another, the miles of development roads requi and the amount of funds deemed necessary are expec to increase. Likewise, increased demand for bet highways and oiled roads will probably increase m terially the amount required to bring the forest hi ways up to satisfactory standards.

Polk County, Tex., Surveyed to Dete mine Prospective Returns from Gro ing Pines

The latest in a series of county-wide timber surve by the Southern Forest Experiment Station, design to bring out information as to the actual returns th may be expected from timber growing, is a study Polk County, Tex., on which field work was complet in July, 1931. The Texas Forest Service and t Texas Agricultural Experiment Station cooperated this work. Forestry conditions in Polk County a believed to be typical of those existing throughout large area in southeastern Texas and southern Louisia The county lies chiefly in the shortleaf-loblolly pi type. On much of the longleaf area which it includ the longleaf type has been replaced by loblolly a shortleaf pine and by scrub oak. Timberland mak up 82 per cent of the county's area, being subdivid as follows: Bottomland, 16 per cent; flatland, 33 p cent; hammock, 9 per cent; ridge, 32 per cent; slop 9 per cent; swamp, marsh, and water, 1 per cen Growth is prolific, and except on a few longleaf sit the pines are reseeding satisfactorily.

The survey was facilitated by the availability of good soil map. Eight strips, 5 miles apart, were ru across the county from east to west, and circul sample plots of one-fourth acre each were located quarter-mile intervals. On the forested plots bot pines and hardwoods more than 1 inch in diameter breast height were tallied by 2-inch diameter classe as main stand or suppressed trees and according t species. Pines less than 1 inch in diameter wer tallied by species and number in each quadrat of 0.01-acre circle concentric with the larger circl Species of reproduction were recorded for 0.01-ac plots at 5-chain intervals. Five men covered 200 mil of strip at an average rate of 3.51 miles per man pe day.

In addition to the county-wide timber survey, a examination was made of the farm woodlands on 7 farms scattered through the county, plots being take closer together than in the strip survey. Informatio was obtained as to income from forest products cut an sold or used on the farms and as to taxes and othe ts of growing timber. Records were obtained also to forest products removed from the forests of the inty, including quantities, values, and production ts. Plots on large holdings will be used to show at such holdings may be expected to produce and the source of data on growth, stands, cuts, and penses which will form the basis of estimates as to financial possibilities of growing pine.

* * *

The net area of the national forests was expanded 696,870 acres in the year ending June 30, 1931, ich made it total 160,787,687 acres. Approximately),000 acres of this gain is accounted for by an addi-n to the Boise National Forest, Idaho, and nearly at much is due to the establishing of the Hiawatha, arquette, and Ottawa National Forests, in Michigan. nds acquired under the Weeks and Clarke-McNary ws within the year in the Eastern Region and in the ke States Region totaled 497,444 acres.

* * *

Appointments to the Forest Service from the junior rester register of 1931 have reached a total of 32, cluding 14 for administration and 18 for research.

Visibility Map for Check on Lookout Performance

As a part of the visibility study included in the fire research which the California Forest Experiment Station has under way, a composite visibility map for all points occupied in the Sacramento Canyon unit is being used to check lookout performance. This map shows areas visible to three or more lookouts in blue, areas visible to two lookouts in red, and areas visible to only one lookout in yellow. Blind areas are left uncolored. When a fire is reported the dispatcher locates it on his map and determines which lookouts ought to see it. If the lookouts do not report, they are called and their failure to report is recorded, with the reason.

* * *

Forest fuel wood consumed in Oregon and Washington in 1930 amounted to 1,798,076 cords valued at $10,036,969, or $5.58 per cord, according to figures compiled by H. M. Johnson, of the Pacific Northwest Forest Experiment Station. Incorporated cities and towns consumed 546,833 cords. Per capita consumption in Oregon amounted to 0.99 cord.

General Forest News

resent Status of Blister Rust Control in the United States

By S. B. **Detwiler**, United States Bureau of Plant Industry

The application of blister-rust control to an area 8,000,000 acres of white-pine lands in the eastern nited States has been possible because of the excep-onal value of white pine and because the control easures are simple and effective. The success of tensive blister-rust control in the East, together with e progress that has been made in developing similar ethods adapted to western forest conditions, gives s grounds for hoping that control of the rust will rove practicable in the West. Generous cooperation n the part of State officials, lumbermen, and public-pirited citizens, and the knowledge that western hite pine is the foundation of economic welfare in the nland Empire, furnish the incentive for the battle on he western front.

The rust is known to be established on pine at 34 centers in Idaho,[1] one in eastern Washington, and several in Oregon. Western Washington may be considered as generally infected. The epidemic is intensifying in Idaho with startling rapidity and the rust must be expected soon to appear in California. To have been entirely effective, initial eradication of Ribes from the best white pine sites should by this time have been completed in Idaho and well begun in California. There is still time to accomplish extensive control in Idaho, eastern Washington, and western Montana, but the work must be done rapidly and well. Preliminary organization of the cooperative control forces has been perfected and the gravity of the situation is realized. Success or failure of control in the Inland Empire depends upon the rate at which Ribes are eradicated from the pine lands in the next five years. There are more than 3,000,000 acres of white-pine lands in this region.

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[1] The full extent of pine infection in a region which the rust is just tering, such as Idaho, can not be accurately determined, for the reason at blister-rust cankers do not show up on a pine tree until three years ter the tree is infected. Even after three years the cankers are very nall and difficult to find. For each new infection center found, there-re, many more remain undiscovered. Thus in a block 15 miles square the St. Joe National Forest, near Avery, Idaho, one small center of fected pines was found in the fall of 1930, but 18 additional centers ere located in July, 1931. These centers had from one to seven infected trees each, as a result of infection occurring in 1927. The existence of fresh infection at so many points in this locality indicated the presence there of a larger and older center of spread. Persistent search finally disclosed such a center in a remote valley on the southern edge of the area. Here the first few pines were infected about 1923 and at the present time more than 50 per cent of the pines on 100 acres are infected, some trees having 50 to 100 cankers. Evidence of this sort indicates that the rust has assumed epidemic character in Idaho.

Control of white pine blister rust differs from control of many other forest-tree pests because it does not require any treatment of the pines such as spraying or dusting or cutting out the diseased trees. It is comparable to the protection of grazing stock by the eradication of poisonous weeds. This disease can not be communicated directly from pine to pine. Before it can attack pine it must develop in a preliminary phase on currant or gooseberry bushes (Ribes). Therefore, even though a pine stand has become infected the thorough removal of Ribes from the stand and from land surrounding it will prevent further infection of the pines.

The cost of initial control work varies directly with the abundance of Ribes plants and to a considerable extent with the character of the cover and with the topography. Maintenance costs will be influenced by these same factors, but the need for repetition of Ribes eradication year after year will depend to a considerable degree on forest-management practices. In the stream type in the Inland Empire region conditions remain favorable for Ribes reproduction from seed, and so far as we now know such areas will need reworking at fairly frequent intervals. After the Ribes have been systematically cleared from the stream type several times, Ribes seed production will probably be so reduced that effective maintenance of control conditions will be possible at low costs. It may be, also, that regrowth of Ribes in this type can be permanently crowded out by encouraging the growth of other plants.

Within the upland forested sites natural control factors exert an important influence. Most of the Ribes plants require sunlight for their best growth and can not survive under strong competition from forest trees. On forest areas freshly denuded by broadcast burning or clear cutting Ribes plants come in thickly and thrive. They mature quickly and produce fruits abundantly before the young forest trees attain sufficient size to inhibit their development. As the forest growth progresses, further establishment of seedling Ribes becomes impossible and the bushes already established weaken and gradually die out. This process is, of course, slow and incomplete and does not generally make Ribes eradication unnecessary; nevertheless it tends to set up an effective barrier against the regrowth of Ribes on forested areas that have been systematically cleared of them. It also offers opportunity to reduce the cost of rust control through a system of forest management that does not destroy the ground cover.

To a great extent the costs of Ribes eradication work in the Inland Empire vary inversely with the age of the forest stand. The average cost per acre in any block or drainage is governed by the ratio of the different types. The cost is greatest in the stream type and is progressively less in reproduction stands, pole stands, and mature stands. Cost of control varies also with the size of the timber tracts to which control is applied, since it is necessary to create a Ribes-free protective zone around the pine. To surround a single acre of pine with a protective zone one-fifth mile in wid necessitates clearing Ribes from 122 acres in additi to the acre of timber. If a control area of four tow ships is protected by a zone one-fifth mile wide the co of the work in the protection zone is only one-fourteen of the cost on the protected acreage, or 7 per ce additional. Another reason why large continuo tracts must be chosen for the application of contr measures in the West, at least for the present, lies in tl fact that western white pine is much more readily a tacked by the rust than is northern white pine and tl concentration of Ribes in the stream-type probably wi cause heavy damage to western white pine stands of a ages within a half-mile radius of such concentratio and possibly to stands farther away.

A highly encouraging feature of the situation as i relates to cost and speed of Ribes eradication in th West is the success attained in destroying concentra tions of Ribes by spraying the plants with a solution o sodium chlorate. The outlook is bright for furthe reduction in control costs by chemical means, as we as by improvements in manual methods of eradicatin Ribes.

The public has so long held white-pine wood in higl esteem that the fungous and insect enemies of the commercial 5-leaved pine species have come to public attention to a greater extent than is the case with the enemie of most commercial timber trees. Hence one frequentl reads that although northern white pine is the preferre species for growing on a certain site a substitute specie is recommended because it has fewer enemies. Fifteen years' systematic control effort has demonstrated that the blister rust offers little handicap to the production of northern white pine on 95 per cent of its sites. The cost of blister-rust control in the East should not exceed $1 per 1,000 feet of lumber produced and in most cases should be only 5 to 10 cents per 1,000 feet, especially if attention is given to keeping the area fully productive by ample stocking. If a production program is mapped out wherein the sites are chosen for suitability to this purpose I believe there will be no difficulty in producing northern white pine in adequate quantity and with profit. Obviously it will pay to apply simple measures for improving the stands as well as to protect them. Under a systematic program of northern white pine culture we can assume that the most favorable sites are occupied by this species, with low control costs. If it pays to grow any timber species it will pay to grow northern white pine under these circumstances.

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Birds have effectively controlled two outbreaks of the southern pine beetle on the Pisgah National Forest, N. C., according to observations of R. A. St. George, of the Bureau of Entomology. The beetles entered the trees in August, 1930, but were brought well under control through the work of the birds by September of that year. By the first of April, 1931, the birds had cleaned out 90 or 95 per cent of the brood.

ccessful Reproduction of Longleaf Pine on Norfolk Soils

By H. H. Chapman, Yale School of Forestry

One of the most striking examples of natural regenera- n of longleaf pine in the South is found on an area of out 20,000 acres owned by the Alger-Sullivan Lumber . in townships 1, 2, and 3 north, ranges 7 and 8 east, Escambia County, Ala., lying east of Escambia Creek d west of the Selma division of the Louisville & shville Railroad. These lands were purchased by e company in the year 1900. They had been team gged during the years 1898 to 1900, the timber being t to about 15 inches at the stump. At the time of this tting no attention was given to the disposal of slash or provision for future timber production.

About 12 years ago, under the guidance of Austin ry, the company began thinnings on portions of e tract where the trees were from 10 to 15 years old. ie thinnings were in progress through a period of ree years, being so handled that no excessive quantity slash accumulated on the ground and the trees finally 't standing were carefully spaced. About eight years o the company plowed firebreaks along the roads and d some work in the way of making firebreaks on e timbered area and preventing and stopping woods es. During the past three or four years they have ven more attention to fire prevention, and while they ve not succeeded in eliminating fires they have made me progress in this respect. During the past 10 or years the company has carried out salvage cuttings lightning-struck and bug-killed trees. The trees ve been cut so as to fall into open places, where ssible, and the tops left unlopped. Elsewhere the ash from the tops has been lopped and piled.

This tract is almost completely restocked with long- af pine varying in age from seedlings to timber 50 nd 60 years old. Parts of the area show almost erfect examples of reproduction under group selection ethods, several distinct age classes being present on mparatively small areas. Most of the reproduction more than 8 years old, which means that it became tablished during the period when fires burned equently—in most cases, annually. There were few gs; and the soil types, Norfolk and Orangeburg, vor deep early rooting and strong growth of the edling, which result in the initiation of height growth early as the third year. To these facts is due the ccess of natural reproduction.

A tract of some 60,000 acres in Baldwin County, la., owned by the Tennessee Coal & Iron Co., is of milar character. This tract has been held about 12 ars. In purchasing it the company excluded any nds that had not already become heavily stocked ith second-growth longleaf pine of sapling and pole zes. Such stands were found to coincide so closely ith the Norfolk series of soils that a soil map was ie main dependence in selecting the areas to pur- ase. Fire protection, beginning from 8 to 10 years ago, has shown striking results in improved growth and density of stands; but the entire area had already restocked, owing to favorable soil and rapid start of the seedlings, before annual fires were stopped.

Preservative Treatment of Wood Shows Slight Decline in 1930

The quantity of wood treated with preservatives in the United States in 1930 was 8 per cent less than the quantity so treated in 1929, according to figures compiled by R. K. Helphenstine, of the United States Forest Service, on the basis of information furnished to the American Wood Preservers' Association by all the treating plants in operation during the year. The total quantity of wood so treated during the year, by either the pressure-cylinder or the open-tank method, was 332,318,577 cubic feet. Pressure processes were used in treating 90 per cent of this quantity.

In 1930 a total of 204 plants were in active operation, or one more than in 1929. These included 134 plants of the pressure-cylinder type, 53 open-tank plants, and 17 plants equipped for both pressure and non-pressure treatment.

Decreases from quantities reported in 1929 were shown by all but one of the eight classes of material treated in 1930, the exception being switch ties. Crossties showed the greatest decrease, 23,267,988 cubic feet. Other large decreases were as follows: Poles, 1,896,171 cubic feet; wood blocks, 1,839,685 cubic feet; and construction timbers, 1,190,442 cubic feet.

The treating plants used 5.5 per cent less creosote and 5.2 per cent less petroleum in 1930 than in 1929. Their consumption of zinc chloride registered a decrease of nearly 30 per cent, although in the treatment of every class of material other than crossties and switch ties this salt was used in greater quantities than before.

The quantities of materials of different classes treated by the plants and of preservatives used by them during the years 1929 and 1930 were as follows:

	1929	1930
Preservatives used:		
Creosote—		
Domestic [1] ... gallons	134,063,664	145,595,733
Imported ... do	92,310,563	68,308,688
Total ... do	226,374,227	213,904,421
Petroleum ... do	29,656,181	28,100,316
Zinc chloride ... pounds	19,848,813	13,921,894
Miscellaneous:		
Salts ... do	1,188,148	1,770,925
Liquids ... gallons	38,410	202,891
Material treated:		
Crossties—		
Hewed ... number	39,538,193	30,009,883
Sawed ... do	31,484,910	33,257,224
Total ... do	71,023,103	63,267,107
Switch ties ... board feet	173,107,698	175,472,552
Piles ... linear feet	25,324,255	25,176,923
Poles ... number	4,383,768	4,276,031
Wood blocks ... square yards	2,610,335	1,909,503
Construction timbers ... board feet	242,445,744	228,160,433
Cross arms ... number	3,158,165	2,096,234
Miscellaneous ... board feet	134,635,355	123,410,202

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[1] Includes distillate coal-tar creosote, creosote coal-tar solution, refined water-gas tar, and water-gas tar solution.

Living Fence Posts of Black Locust

Young black locust trees become fence posts without being cut and with a minimum of injury from the nails that hold the fence wire, when grown and treated according to the method advocated by Neal Kitchens, of Warm Springs, Ga. Doctor Kitchens has been experimenting with black locusts for five years. He describes his method as follows:

> Set out the plants in rows 3 feet apart each way. When they are 5 feet tall or taller, transplant them to the place where they are to be used as posts. Cut the roots not more than a foot long. From each piece of root left in the ground a new tree will shoot up. A plot of ground 30 feet by 40 feet will produce from 150 to 250 trees 5 feet tall or taller every second year. When transplanting the trees cut them back to 5 feet, the height of the fence. The 2-year-old trees grow better than any other age. The growth depends on the soil. Here on Jonah Farm we have some growths of 30 feet or more in two years. The remaining time required to grow the trees big enough for posts is from two to five years.
>
> In tying the barbed wire to the tree, if you break the bark the tree will soon cover the wire, a condition undesirable for several reasons. The best solution of this problem we have found is to use a piece of galvanized roofing 2 inches by 4 inches with two holes an inch apart in the short dimension. Use number 8 round nails instead of staples. Drive the first nail under the wire through the lower hole. When it lacks an inch of being driven the whole way in, bend it up. Then drive a nail in the upper hole and when an inch remains bend it over the head of the first nail. Then if you ever want to remove the wire you can do so without injury to the tree.

"Philippine Mahogany" Approved as Trade Name

In a recent decision the Federal Trade Commission has ruled that the term "mahogany" as applied to Philippine hardwoods that resemble true mahogany does not deceive or injure the public nor constitute an unfair method of competition in interstate commerce. Previously, in 1926, the commission issued a cease-and-desist order against six importers of Philippine lumber preventing them from describing the wood as mahogany, and an appeal from this decision to the courts was lost.

Another recent ruling of the commission is to the effect that western yellow pine (*Pinus ponderosa*) lumber must not be offered for sale as "white pine."

Forestry Film Strips Available

The Office of Cooperative Extension Work, United States Department of Agriculture, having entered into a new contract with the firm that for several years has been manufacturing its film strips, is calling attention to the availability of these strips at prices ranging from 35 to 71 cents each. The 120 series of film strips which the office has available include a number dealing with farm forestry and related subjects. Lecture notes provided with each strip. A list of the film strips, instructions as to how they may be purchased, be obtained by writing to the Office of Coopera Extension Work, United States Department of Agri ture, Washington, D. C.

Needle-Miner Injury to Spruce in N England

By C. W. Collins and T. H. Jones, United States Bureau Entomology

Leaf-miner injury to spruce in New England v reported in 1930 to the gipsy moth laboratory of t United States Bureau of Entomology, at Melr Highlands, Mass., and during the past year some att tion has been given to this problem by workers in t laboratory. Field studies have been made with t idea of ascertaining how much damage is being do and how to prevent it. After the collection of mater in the field, investigations have been carried on at t laboratory to learn to what species of small mot these leaf miners belong, and to obtain informati on their life histories, their habits, and their par sites.

The most severe infestations noted in 1930 cover small areas only, sometimes less than an acre eac They seemed to be confined to a district near the se coast of Maine, between Orrs Island and Pemaquid Sagadahoc and Lincoln Counties, and did not appear be of long standing. Both red spruce and white spru had been attacked. As yet no evidence has been foun of trees being killed by the leaf miners nor have an completely defoliated trees been noted, though th percentage of leaves mined is often high. The un sightliness of heavily infested trees is a matter of con cern to some owners and caretakers of summer res dences in the heavily infested district, who consequentl are interested in control measures.

Studies so far made indicate that Epinotia nanan Treitschke is the predominant species, although som of the injury is caused by Recurvaria piceaella Kearfot and possibly by others. The two species mentione have somewhat similar habits. The eggs are laid i the summer and the larvæ that issue from them hollov out the needles. The larvæ become torpid when col weather comes and remain in this condition until th following spring, when they resume feeding. Injur by both species was reported in this country man years ago. Epinotia nanana Treitschke was firs described from Germany.

It is too early to give any definite directions as t control measures, but the experiments so far conducted indicate that timely, thorough spraying with lead arsenate during the first part of July is effective. From 4 to 5 pounds of powdered lead arsenate should be used to 100 gallons of water, with 4 ounces of fish oil added for each pound of the poison as an adhesive.

Brown Co. Offers Hardwood Seed of Certified Origin

n sales of New England hardwood seed the Brown , Berlin, N. H., is prepared to provide with each pment made this fall a record showing where the d were collected and the approximate elevation d mean summer temperature of the place of origin. cies of which seed are offered by the company ude white ash (*Fraxinus americana*), paper birch *tula papyrifera*), yellow birch (*Betula lutea*), erican beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), and red oak (*Quercus borealis maxima*).

Softwood species of which this company supplies after-ripened seed certified as to origin are balsam fir (*Abies balsamea*), white spruce (*Picea glauca*), Norway spruce (*Picea excelsa*), black spruce (*Picea mariana*), red spruce (*Picea rubra*), Norway pine (*Pinus resinosa*), northern white pine (*Pinus strobus*), Scotchpine (*Pinus sylvestris*, var. *rigensis*), northern white cedar (*Thuja occidentalis*), and eastern hemlock (*Tsuga canadensis*).

Another service offered by this firm is laboratory testing of tree seed as to purity and germination, at a fixed charge per sample.

Foreign Notes

ocal Commissions Supervise Management of Private Forests in Finland

Jnder a Finnish ordinance of 1917 it became illegal cut timber without provision for protecting natural eneration, or to cut a growing young conifer forest erwise than in thinning it. Violation was made nishable by prohibition of cutting on the forest inved and by the requirement that forest regeneran be brought about by artificial means. To ence the ordinance provincial forestry commissions d inspectorships were created and also communal estry commissions. Before timber on private land s cut for sale it was required that the date and place the projected cutting, and the quantity of wood ich it was intended to cut, be reported to the comnal commission, unless the cutting was to be made cording to a duly approved plan or as a thinning. 1928 the cuttings coming under this requirement mbered 29,019, involving 10,300,000 cubic meters wood and a total area of 1,179,000 hectares.

By the end of 1928 there had been 1,215 proved olations of this ordinance, involving a total area of ,270 hectares. In consequence of these infractions tting was banned on 953 forests with a total area of ,142 hectares. Reforestation work carried out on t-over areas under the surveillance of the provincial estry commissions included seeding 1,559 hectares, anting 8.6 hectares, and clearing for reforestation 74 hectares. The expense of this reforestation ork amounted to 688,610 Finnish marks.

A new law applying to private forests became effective January 1, 1929, repealing the law of 1917. nder the new law 18 forestry commissions are desigted, the duties of which combine measures opposed deforestation with encouragement of correct forest anagement practice through educational activities cluding supervision of forestry operations on private nds.

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Recent Japanese legislation provides for the estabhment of a system of five or six national parks.

Silviculture in the Netherlands

(From a paper by E. D. VAN DISSEL, Director of the Forestry Administration of the Netherlands)

Between 1833 and 1930 Holland's forested area increased from 169,000 hectares to 254,138 hectares, and its total area of uncultivated land diminished from 889,000 hectares to 378,225 hectares. (In 1930, forested lands composed 7.76 per cent of the country's total area, and uncultivated lands composed 11.55 per cent of the total.) Afforestation has been effected principally with conifers. In 1833 the coniferous forests of the Netherlands were less than one-fourth as extensive as its broadleafed forests; in 1930 they occupied 152,647 hectares as compared with 101,491 hectares occupied by broadleafed species. Factors in this trend were the growing demand for mine timbers, which resulted in an advance in the price of softwoods, the relative simplicity and inexpensiveness of the propagation of conifers, and the low site requirements of Scotch pine. The agricultural crisis of 1870–1880, also, put an end to agricultural use of much sandy land. Later the more and more widespread use of chemical fertilizer turned the balance in the other direction, and in the present century private owners have shown a lessening interest in forestation. It is due principally to State and communal intervention that the area of forests in Holland is not now diminishing.

On January 1, 1929, the division of the forested area among the different ownership classes was as follows: The State, 6 per cent; communes, 8.5 per cent; organizations, 1.4 per cent; and private owners, 84.1 per cent.

Much of Holland's State-owned forest land was sold in the first half of the nineteenth century. In the second half of the century such sales diminished; the widespread cutting of young privately owned softwood forests for export of mine timbers had brought home to the Government and also to the people the fact that a permanent forestry property is a matter of general interest.

In 1888 a group of landowners, following the Danish example, founded the Nederlandsche Heidemaatschappij (Society for the Clearing of Heathlands), an institution that has done much to transform uncultivated lands into meadows and fields and to bring about silvicultural progress. From the first, the State entrusted to the society the forestation of certain dune areas.

A law of 1899 created a State forestry administration, the task of which was confined at first to the conservation of certain forests and the forestation of uncultivated soils. A decree of 1907 extended the administration's functions so as to make technical and financial aid available to communes in afforesting uncultivated lands. This aid was later made available to other landowning bodies. The financial aid takes the form of a free advance to be repaid in 50 years. At present a maximum of 80 per cent of the expense of forestation is allowed, to the amount of 200 florins per hectare. On January 1, 1930, 48 communes and 1 association were profiting by this form of State aid. At that time a total surface of 14,280 hectares had been dedicated to reforestation with State aid, and of this total 9,481 hectares had already been forested. Lands thus afforested are permanently subject to State supervision.

The State forests in 1930 had a total area of 40,716 hectares. In the 10-year period 1920–1929 the State forestry administration, the communes, and private owners afforested about 17,700 hectares of uncultivated land.

The Netherlands climate is rather clement, and is characterized by high humidity, cloudiness, and strong winds. The mean annual temperature is 10° C. Annual rainfall averages 707 millimeters. Silviculture in Holland is practiced almost exclusively on sandy soils, the fertile soils being largely monopolized by agriculture and truck farming.

A. J. van Schermbeek, forest administrator and from 1900 to 1915 professor in the Wageningen School of Agriculture, Horticulture, and Silviculture, is credited with popularizing silvicultural principles in Holland, bringing into disfavor the practice of growing Scotch pine in pure stands. For planting as an understory to Scotch pine he advocated the use of Quercus rubra, Fagus sylvatica, Carpinus betula, and Castanea sativa. Conifers which he used in mixture with it were Pseudotsuga taxifolia, Larix leptolepis, and Abies alba.

To assist initial growth, it is a common practice to treat the soil with compost. To improve soil worn out by long culture of pines or by repeated removal of litter, after a clear cutting lupines are sometimes cultivated and chemical fertilizers used.

The work of afforesting heathlands is usually begun by plowing the soil. Often, also, a disk harrow is used. This and the digging of whatever drains and ditches are needed constitute the only preparation required for planting Scotch pine. One-year-old seedlings or, rarely, 2-year transplants, are use
seed are sown.

Along the roads, which are 8 to 10 meters
rows of birch, red oak, black cherry, black locust,
are planted as a protection against fire.

Heathlands of better quality are often forested
Quercus robur, Fagus silvatica, Larix europæa,
leptolepis, Pseudotsuga taxifolia, etc. In prep
the soil for these species it is usual to cultivate lu
(*Lupinus luteus*) for a year or to use chemical
tilizers. Frequently, after the lupines are tu
under, 1 or 2 year old plants of Alnus incana ar
out at the rate of 4,000 or 6,000 per hectare and
principal species are planted between them. As a
a mixture of principal species is planted. Ordin
another crop of lupines (*Lupinus angustifolia*
planted at the same time with the trees. Somet
birch is used as the nurse species.

In preparing to afforest surfaces covered with s
ing sands, the edges of the sand hills are rounded
and if vegetation is present holes are dug for the t
Basins formed by æolian erosion are worked ei
with the plow or with the spade to a depth of 30 o
centimeters. So much of the land as is not veget
is then covered with cut brush, weighted at i
vals with shovelfuls of sand. Scotch pine is pla
on these areas, and in a smaller proportion Aust
pine and Corsican pine. As the pines become olde
effort is made to introduce broadleafed species.

In efforts to reforest the dunes, a special difficult
the constant sea wind. The presence of many k
of herbs has seriously impeded the initial growt
trees on the dunes. Preparatory work consist
making holes for the trees or digging trenches for th
or spading the whole surface. To fix the soil, i
usual to plant sedges and to place cut brush
the places most exposed to the sea wind. The spe
preferred for afforesting the dunes is Austrian p
Corsican pine, also, prospers on well protected si
and in some places maritime pine is found servicea
On spots retentive of moisture such hardwoods as
beech, and poplar are planted. For borders to se
as windbreaks, alders, hawthorne, poplar, birch,
willow are used.

On Terschelling, an island in the North Sea, g
results in dune afforestation have been obtained
some years by inserting in each planting hole a
saturated with water, against which the tree is pla

The oldest of the dune forests are now furnish
wood products. Sheltering and protecting the sh
they also represent a considerable "touristic" valu

The Wageningen school of agriculture offers a 5-y
scientific course in silviculture. Practical instruct
in the rudiments of silviculture and agriculture
given by the Nederlandsche Heidemaatschappij, se
rate courses being provided for students who have
secondary-school training and students without s

ning. Since 1919 the State has maintained a icultural experiment station at Wageningen.

n 1926 there was founded in Holland an organization guarantee Scotch pine seed as to source. The mems engaged not to produce or place on sale foreignwn plants or seeds. The harvesting of seed and pagation of plants by the members of this society subject to Government control.

)uring the war, a provisional forestry law was pted empowering the Minister of Agriculture to oid the cutting of forests or to place conditions upon This was replaced in 1922 by a forestry law that kes provision against natural enemies of forests and inst fire risk involved in the operation of railroads provision for the maintenance of natural beauty. s law requires that notice be given to the director the forestry administration before timber is cut on nmunal and other lands. The law provides also subventions to communes and other public bodies cases involving the maintenance of natural beauty ned by forests. In 1931 such subventions amounted 30,000 florins.

law of 1926 exempts from taxation the revenues n forest exploitation other than that of coppice. der a law of 1928 the Government lays restrictions cuttings in forests having a special degree of natural uty, these restrictions being balanced by tax relief. Areas having special interest from the point of view ootany, ornithology, geology, or history, or because natural beauty, are set aside by the Government as ural monuments. The most notable of the areas tected in this way are located on the islands of xel, Vlieland, and Terschelling, in the North Sea.

illow Culture in the West of England

Willow culture provides employment for about 5,000 n, women, and children in Somersetshire, England, oroximately that number being engaged in growing l marketing the shoots and in making wicker articles, orts Consul Roy W. Baker, Bristol. The area under low culture in Somersetshire exceeds 3,000 acres. ce 1926 the national research station at Long Ash-, near Bristol, has been experimenting with methods spraying the willows in order to protect them from beetles which in extreme cases render the willow oduct of an entire district unmarketable. The chines which the station has devised for this purpose lude horse-drawn devices for wet spraying and gine-driven machines for powder dusting, as well as a iety of hand apparatus.

* * *

Jnder a 1930 amendment to the land tax act of va Scotia, any private owner of as much as 1,000 es of timberland must obtain a Government license ore felling any timber of potential pulpwood value. e act says "A cutting license may be for such period l in respect of such trees and subject to such terms l conditions as the minister deems proper."

Eleventh Year's Work of the British Forestry Commission

In the year ending September 30, 1930, the British Forestry Commission, entering upon its second decade of activity, acquired a net total of 85,230 acres of land, of which 34,360 acres was plantable, and planted or sowed 24,721 acres. Conifers and hardwoods were planted in the proportion of about 11 to 1. The stock used in forming plantations and "beating up" previous years' plantations was 44 per cent Scotch and Corsican pine, 26 per cent Norway and Sitka spruce, 13 per cent European and Japanese larches, and 5 per cent Douglas fir. The lands planted during the year included 1,174 acres of former Crown woodlands and 2,048 acres replanted after damage by fire. An area of 269 acres of existing woods was underplanted.

During the year 159 additional forest workers' holdings were completed, bringing the total to 777.

Total expenditures of the commission for forestry operations in the fiscal year 1930 were £675,631. Expenditures in acquiring land, with buildings and standing timber thereon, amounted to £164,760, and expense in respect of land held on land lease or feu amounted to £21,880. Cultural operations cost £280,356, of which £206,787 was spent on plantations and £73,569 on nurseries. Expenditures on forest workers' holdings totaled £108,575, and income from the holdings was £12,206. Grants to private individuals and local authorities for planting forest trees and clearing scrub growth during the year totaled £12,111.

In May, 1930, the guaranteed minimum weekly wage of adult male workers in regular or seasonal employment was raised to 35s.

The maximum number of persons (exclusive of divisional and district officers and office staffs) employed in the commission's forests at any time during the year was 3,850. Forest workers resident on holdings numbered 953.

The commission's nurseries on September 30, 1930, had a total extent of 863 acres and were stocked with 254,000,000 seedlings and 100,000,000 transplants.

Nursery investigations during the year dealt in the main with growing seedlings for use on cultivated sites, the technique of growing birch and alder, and the improvement of germination of European larch and Sitka spruce through special methods of covering the seed to prevent caking. Satisfactory progress was reported in all three projects. Plantation experiments were continued on peat soils and on poor calluna heaths. Plots of different nurse species were established on shallow soils over chalk at Buriton Forest, in Hampshire, experience having shown that beech and larch planted direct on such soils often suffer severely from frost and drought. Additional experimental plots were established with plants grown from different lots of Scotch pine, lodgepole pine, and oak.

The total net land area acquired by the commission in its first 11 years of activity was 540,633 acres, of which 344,590 acres was plantable. Of the total plantable area 59 per cent was situated in England and Wales and 41 per cent in Scotland. Within the 11 years 153,072 acres of the land was planted, 145,818 acres with conifers and 7,254 acres with hardwoods. Replacements were required by 7,598 acres of conifers and 2,330 acres of hardwoods.

◆

The Mexican Government has undertaken to eradicate Spanish moss from the forest of Chapultepec, where the moss is present in great abundance particularly on cypress. Deformation and even death of vigorous cypress and other trees in Mexican forests is said to have resulted in many instances from the fact that the moss completely covered the foliage of the trees and thus interfered with the trees' assimila functions. The moss is found objectionable als harboring injurious insects.

◆

Forest planting which the Forests Commissio Victoria, Australia, planned to carry out this se would extend the State's softwood plantations 5,000 acres, making them total 27,500 acres. June 10 report of American Trade Commissioner S Peabody stated that 500 men were engaged at time in the State's planting and forestry work and the forestry commission hoped to receive unemp ment-relief funds enabling it to double this num Douglas fir, western yellow pine, and Corsican were the principal species being planted with the ai unemployment-relief funds.

Personals

William T. Cox, who returned some months ago from Brazil, has been appointed chairman of the Minnesota Conservation Commission. Before going to Brazil in 1929 to head a Federal forest service Mr. Cox was director of the Upper Mississippi River Wild Life and Fish Refuge of the United States Bureau of Biological Survey. Previously he served for 11 years as State forester of Minnesota.

Willis M. Baker has left the directorship of the Pennsylvania Forest Research Institute to accept that of the Central States Forest Experiment Station, succeeding E. F. McCarthy, now professor of silviculture in the New York State College of Forestry. Mr. Baker received the B. S. degree in forestry from the Pennsylvania State College in 1914. After three years' experience with the United States Forest Service he joined the State forestry organization of New Jersey. From 1922 till 1930 he was associate State forester of New Jersey, engaging largely in research.

William Crocker, director of the Boyce Thompson Institute for Plant Research, Yonkers, N. Y., has been made acting director and general manager of the Tropical Plant Research Foundation. The foundation's offices have been moved temporarily to Yonkers, where its address is 1086 North Broadway.

David T. Mason, consulting forester of Portland, Oreg., has been appointed manager of the new Western Pine Association.

Joseph S. Illick, formerly State forester of Pennsylvania, has been appointed head of the department of forest management of the New York State College of Forestry, at Syracuse University, with which he was connected for a portion of the past school year as special lecturer in silviculture.

Edwin A. Ziegler, after two years' service as fo economist of the Southern Forest Experiment Stat has returned to Pennsylvania as head of the Penn vania Forest Research Institute, at Mont Alto. D tor Ziegler was connected with the Pennsylvania St Forest School at Mont Alto, as teacher and direc from 1909 to 1929.

J. E. Lodewick has joined the staff of the Pac Northwest Forest Experiment Station as silvicultu in charge of the section of forest products. Doc Lodewick received the degrees of B.S., M.S., and Ph from the New York State College of Forestry, and taught wood technology and allied subjects there elsewhere. Recently he has been connected with Virginia Polytechnic Institute.

J. W. K. Holliday has been appointed State fores of West Virginia, succeeding Harold S. Newins. Holliday is a graduate of the Pennsylvania State F est School and has had experience as a district fores in West Virginia. He is a native of West Virginia, home being at Parkersburg.

Thornton T. Munger, director of the Pacific Nor west Forest Experiment Station, has been designa as official representative of the United States For Service at the Fifth Pacific Science Congress, to held in Victoria and Vancouver, British Columb May 23–June 4, 1932.

C. C. Delavan, professor of forest extension, Henry R. Francis, professor of forest recreation, of New York State College of Forestry, have been gran sabbatic leave for the school year 1931–32. Profes Delavan will take up graduate work at the Univers of Michigan, and Professor Francis will work for advanced degree at the University of Washington.

he forestry department of the Michigan State Col-
, East Lansing, Mich., of which the late A. K.
ttenden was head from 1915 to 1930, as reorgan-
l this summer has the following staff: Professor of
stry and head of the department, P. A. Herbert
rnell, '21), formerly senior forest economist with the
ted States Forest Service; associate professor in
rge of the utilization series, Harold S. Newins
le, '11), formerly associated with the Oregon Agri-
ural College, the Cutler Dry Kiln Co., and the
nsylvania State College, and more recently State
ster of West Virginia; assistant professor in charge
ilvics and silviculture, R. H. Westveld (Yale, '25),
the staff since 1928 and formerly with the Pacific
thwest Forest Experiment Station; assistant profes-
in charge of dendrology and municipal forestry, Karl
ssel (Michigan State College, '22), on the staff since
6; in charge of mensuration and protection, A. B.
vman (Pennsylvania State College, '22), formerly
the United States Forest Service in Montana and
ho; in charge of the Dunbar Forest Experiment
tion and Nursery at Sault Ste. Marie (since 1927),
nam Robbins (Michigan State College, '27); exten-
forester (since 1924), Raymond Kroodsma (Yale,
, formerly forester for the United States Military
demy. One position remains to be filled during
school year, that of assistant silviculturist to take
rge of the college nursery, which has an annual out-
of more than 1,000,000 trees, engage in nursery
earch, and conduct the course in seeding and plant-
. The department is entering the new year with
re complete equipment, better library facilities, and
rger operating budget.

. O. Howard retired from the Government service on
e 30, 1931, after 52 years' service in the Bureau of
tomology. Doctor Howard was appointed in 1878,
ear after his graduation from Cornell University, as
of the first three entomologists in the Department
Agriculture. He became chief of the Bureau of
tomology in 1894. Since leaving that position in
7 he has added two books on economic entomology
his very long list of publications. In the month of
retirement he received the 1931 Capper award of
d medal and $5,000 for distinguished service to
erican agriculture. This award was based on out-
nding services in perfecting insect-control measures,
ticularly the biological method of control, and work
the carrying of disease by insects. Doctor Howard's
ns for the immediate future include a trip around
world and studies in Paris.

ay Higgins, supervisor of the Black Hills National
rest, S. Dak., has been transferred to the regional
dquarters of the United States Forest Service
Denver for research work including erosion studies.
is succeeded by Galen W. Pike, who has had charge
the Rochford ranger district on the Black Hills
rest.

Robert W. Williams, deputy game conservation officer of the Bureau of Biological Survey, with headquarters in Tallahassee, has been appointed assistant United States game conservation officer, succeeding Talbott Denmead. Mr. Williams was solicitor of the Department of Agriculture from 1920 to 1929.

William C. Adams, head of the Massachusetts division of fisheries and game, has been appointed chief of the New York division of fish and game.

Burt P. Kirkland, who left the faculty of the University of Washington this year to join the forest survey staff of the United States Forest Service, is now stationed at Washington, D. C.

George W. Peavy, dean of the School of Forestry of the Oregon State College, has succeeded Burt P. Kirkland as a member of the editorial staff of the Journal of Forestry. His editorial field is that of forest protection and administration.

Allen H. Hodgson, who since 1926 has been a member of the forest products research staff of the United States Forest Service in the North Pacific Region, has assumed the duties of personnel training officer for that region.

L. C. Hurtt, supervisor of the Helena National Forest, Mont., has accepted a transfer to the Northern Rocky Mountain Forest and Range Experiment Station, where he will have charge of range management research.

A. G. Simson, since 1923 a member of the Pacific Northwest Forest Experiment Station engaged largely in studies of static and lightning phases of fire weather, has been transferred to the regional office of the United States Forest Service at Portland, Oreg., to carry on a study of portable radio equipment and communication. D. L. Beatty, formerly in charge of this work, has resigned.

G. H. Wiggin, in charge of the State forest nursery of North Dakota, has accepted appointment as forester for the University of Kentucky.

L. G. Hornby, who has charge of a Forest Service study of transportation problems with reference to fire control in the Northern Region, has been transferred from the regional office to the Northern Rocky Mountain Forest and Range Experiment Station. W. W. White and H. R. Richards will continue work on this study as members of the regional office, under the general direction of the experiment station.

Ralph M. Nelson, pathologist in the Bureau of Plant Industry, has accepted a transfer to the Forest Service, and is taking charge of fire-damage studies of the Appalachian Forest Experiment Station. Charles R. Hursh, formerly assigned to this work, is taking charge of erosion and streamflow investigations.

A. D. Folweiler, who was formerly a district forester in North Carolina and who received the M. F. degree from Yale University this year, has accepted appointment as assistant State forester of Florida.

W. D. Humiston, assistant general manager of the Potlatch Lumber Co., has resigned as secretary of the Northern Idaho Forestry Association. His successor is A. A. Segersten, of Potlatch.

N. T. Barron is being promoted from the position of district forester at Spartanburg, S. C., to that of assistant State forester of South Carolina. He will have charge of applied forestry, nursery work, and public-relations matters. W. C. Hammerle, district forester at Wilmington, N. C., will succeed Mr. Barron.

John M. Briscoe, professor of forestry in the Un versity of Maine, is the new president of the Ya Forest School Alumni Association. The new vi president is Raymond E. Rendall, forester of Bat College, Maine.

Paul M. Dunn, who has held the position of distri forester, Missouri State Department of Forestry, ha gone to the Utah State College of Agriculture, Loga Utah, where he succeeds Charles M. Genaux a forestry teacher and extension forester.

P. B. Rowe, junior forester on the Fishlake Nation Forest, Utah, has been transferred to the Californi Forest Experiment Station for work on erosion an streamflow studies.

Bibliography

Decay in Pacific Northwest Conifers

By Ernest Wright, United States Bureau of Plant Industry

Anyone desiring a more intimate knowledge of forest pathology should by all means read Decay in Pacific Northwest Conifers, by J. S. Boyce, which has been published by Yale University as Osborn Botanical Laboratory Bulletin No. 1. This bulletin is written in such a simple, clear style that it immediately becomes of special value to nontechnical men.

In an opening section devoted to a general discussion of decay Doctor Boyce points out that for many years to come decay will continue to be an important factor in the management of coniferous stands in the Pacific Northwest, even though the peak of lumber production in the region is now in sight. In fact, it will increase in importance, since less accessible and less desirable stands in which the quantity of defect is relatively higher are now being reached and must form an increasing proportion of the cut for some years.

Decay is caused by wood-destroying fungi, and is of two general classes. The first is termed delignifying decay because it removes more lignin than cellulose from the wood. In the early stages of delignifying decay the wood is not greatly weakened and can still be used for some purposes. Trametes pini is a typical delignifier. The second is known as the carbonizing type and destroys more cellulose than lignin. Even the early stages of this second type of decay render the wood useless where strength is required. Ultimately the wood is reduced to a carbonaceous mass easily pulverized between the fingers. Polyporus schweinitzii typifies the carbonizing decays.

When decay has been in progress for some time, fruit bodies or conks develop on the exterior of the tree. At maturity these produce myriads of tiny spores which are easily disseminated by the wind. Spores alighting in a suitable place germinate by sending out tiny hyphae which institute decay. The hyphae of nearly all th wood-destroying fungi that attack living trees ar unable to penetrate bark or living sapwood. Entranc to the heartwood is offered them by dead wood i branch stubs, broken tops, and fire scars or othe wounds.

For cruising and scaling timber a knowledge of th indications of decay is absolutely essential. On th subject there exists an enormous quantity of misinfo mation. An experienced woodsman can soon learn th indications of decay and learn how to apply this know edge. Sections devoted to the indications of deca form one of the most important parts of the bulletin.

Discussing rate of decay in the individual tree and i the stand as a whole, Doctor Boyce states that there a general tendency to overestimate greatly the rapidit with which decay progresses. Detailed examples ar given which help materially in explaining the difficulti encountered in estimating rate of decay.

The decay fungi attacking down timber do not wor principally in the heartwood but attack the sapwoo first and in some cases confine their activity to i The fungi causing most of the decay of down timber i the Pacific Northwest Region rarely attack living tree

A discussion of stains and discolorations brings o the fact that considerable confusion exists as to what stain and what the early stages of decay.

Proceeding to the subject of decay as it occurs i specific host trees, the author takes up, more or les in order of importance, the various rots affectin Douglas fir; Sitka and Engelmann spruce; balsam fi western and mountain hemlock; western white, wester yellow, lodgepole, and sugar pine; incense, wester red, Port Orford, and Alaska cedar; western larch; an western juniper. To each type of rot is assigned common name that is descriptive and characteristi of the decay. The individual rots are described an their common means of entrance given. Indicatior decay in the standing tree are dealt with in detail, ich will greatly assist the woodsman. The list of ay fungi with their hosts shows that certain rots, h as the pocket dry rot of incense cedar, are con- ed to a single tree species but that others are much closely restricted. An example of the latter type he red ring rot, which takes first rank in importance l is the most common decay of conifers throughout North Temperate Zone.

The closing paragraphs of the bulletin are devoted measures for the control of decay in the forest. At sent control is economically limited to what can accomplished by indirect measures when the stand cut and through the prevention of wounds. Man is en directly responsible for wounding trees during ging or during road and railroad construction, in zing, and especially through the use of fire. Fire rs furnish perhaps the most common avenue of trance for decay. From the examination of many nds in the Pacific Northwest it appears that after certain period in the life of the stand the yearly or riodic growth increment is less than the yearly or riodic decay. This is particularly true of white fir d Douglas fir. A study of the latter species showed at there was an actual net loss from decay beginning early as 215 years in the most defective stands. It difficult to determine actual financial loss due to de- y in standing timber because so many interrelated nsiderations other than decay enter to complicate ch determinations. The control of decay is a com- cated matter and can be brought about only through ady, long-time effort and by the application of suit- le cutting methods. It will be much simpler in en-aged than in uneven-aged stands, because of the ferent methods of cutting necessarily involved.

A bibliography of 19 references adds to the value the bulletin, as do 34 splendid photographic illus- ations in the appendix. One could hardly desire a re comprehensive work.

ata Available on 1931 Cone Crops of Southern Pines

Estimates by more than 40 observers of the 1931 cone ps of the southern pines in different parts of their nges have been brought together by an intersection mmittee of the Society of American Foresters headed Philip C. Wakeley, of the Southern Forest Experi- ent Station. The estimates are expressed in terms bushels of cones actually collectible by climbing or om felled trees. This information has been prepared distribution in mimeographed form, together with ts of logging operations expected to be in progress in aring stands, local collectors, and stands the high ality of which makes them especially desirable as urces of seed. Copies may be obtained by writing Mr. Wakeley at 600 Stern Building, 348 Baronne reet, New Orleans, La.

Types of Humus Layer in the Forests of the Northeast

By L. G. Romell, New York State College of Agriculture

A paper by L. G. Romell and S. O. Heiberg appearing in Ecology, Vol. XII, No. 3, July, 1931, under the title "Types of Humus Layer in the Forests of Northeastern United States," represents a first systematic effort to apply outside Europe the principles and method laid down by P. E. Müller in his classical studies on natural types of humus layer. It is also a contribution to the classification and nomenclature of forest humus layers in general.

After a critical review of the different proposals of classification, the authors conclude that Müller's system fits the natural conditions best. That this holds true for American as well as European conditions is indicated especially by the flora characteristic of different types of humus layer. A fundamental point of Müller's system is that the classification applies to the entire humus layer (i. e., the top layer of the soil, owing its characteristic features largely to its humus content, no matter whether this content is high or low or whether the humus is "incorporated" or not). The authors strongly oppose the tendency inaugurated by Ramann to classify only the humus, which is but one constituent of the biological unit. Müller's two main types or groups are retained. They are characterized morphologically, as has always been done by the Scandinavian school, contrary to the tendencies in Germany, and some types with unincorporated humus are included in the mull group. Specific types listed are crumb mull, grain mull, twin mull, detritus mull, root duff, leaf duff, greasy duff, and fibrous duff. This list is not supposed to cover every variation possible; it is just an enumeration of conditions characteristic enough and occurring sufficiently regularly within the region to warrant their being recognized as types. The crumb mull is the classical prototype of the mull group, inhabited by large earthworms. The types greasy and fibrous duff have been taken over from the Danish forester Juncker.

The distribution of the types within the region is discussed. Ground-water conditions seem to be a particularly important factor locally. Some plants are listed as indicators of mull and of duff. The most valuable hardwood species of the region seem to be among the mull-preferring plants.

Data are presented on nitrification, pH, and lime content of the different types. Contrary to European experience, laboratory tests disclosed nitrification within all types, even pronounced duffs, and down to a pH of 2.9, which was close to the lowest pH value encountered in any sample, whether nitrifying or not. A great difference was found among the types, however; practically all the mull samples were nitrifying, whereas the majority of samples of pronounced duffs were not. Storage tests yielded surprisingly high values for root duff and other intermediate forms as compared with the crumb mull, while inoculation tests gave results agreeing better with the expectations from previous experience and with the indications furnished by the vegetation. The puzzling results of the storage tests are ascribed to a "sampling effect" to be discussed in a later paper.

The main data are given in concentrated table form on eight pages. A mimeographed appendix of 29 pages, distributed by the authors, gives descriptions of 17 chosen localities including vegetation and soil notes, Bouyoucos analyses, etc.

Park Administration Booklet Holds Lesson for Foresters

By L. F. Kneipp, United States Forest Service

A forested area, as a rule, is a tract of land broken into varied relief by hills and valleys, traversed by rippling or roaring streams and gemmed with lakes and ponds, supporting a diversified cover of trees, shrubs, and flowering plants, and inhabited by a complex society of mammals, birds, fish, insects, etc. Its potentialities of social service are usually subject to a wide variety of interpretations. Foresters are disposed to regard it primarily as a source of timber supply; to the grazing man it means so much cattle or sheep feed; the engineer considers its availability for water storage in aid of hydroelectric power production, irrigation, or navigability; the nature lover insists upon a subordination of its economic uses to its inspirational or recreational aspects—and in consequence is frequently regarded as on the fringe of fanaticism, mild or extreme.

The fact that proper economic or industrial exploitation of natural resources is the basis of our social and cultural order can not be disregarded. A great population can not exist solely upon scenic beauty and nature interest. Nevertheless there is an obvious and growing need for forest areas open to the outdoor recreational activities essential to the well-being and contentment of large populations. It is now fully demonstrated that economic utilization need not be permanently destructive of natural beauty; and foresters must recognize the vast undeveloped opportunity to coordinate the strictly utilitarian and the inspirational phases of forestry if they are to perform adequately the social functions of their profession.

The suggestion that park standards be applied in the management of forest areas is apt to provoke extreme dissent and frequently may be impracticable. Nevertheless, foresters may derive from the experience of park administrators many ideas that will contribute to the establishment of forestry in its proper place in the future order of the Nation. A striking opportunity of this kind is afforded by the publication entitled "New York State Parks—1931," just issued by the Conservation Department of the State of New York. The facts and the r
of progress which this booklet contains, its good ar
ment and its beauty, make it highly valuable t
forester; but its chief value for him lies in the de
stration of the manifold ways in which forested
may be made to contribute to human happines
well-being. It has nothing to do with forestry, b
every forest administrator it should suggest
question: "In the management of the propertie
which I am responsible, how far can I go in devel
these important forms of collateral or supplem
social service which are going to mean so muc
future generations and which will do so much to
the further justification of forestry as a proper for
land utilization?"

Forest Fires in Michigan

By J. R. Curry, United States Forest Service

In Forest Fires in Michigan, J. A. Mitchell and
Sayre present the results of a detailed study of fo
fire records comparable to that which formed the
of Mitchell's bulletin Forest Fires in Minnesota,
lished in 1927. This work has been published by
Michigan Department of Conservation in coopera
with the Lake States Forest Experiment Stat
While Michigan's fire statistics, in common with t
of most other States, are incomplete, and, prior to
last decade, decidedly inaccurate, the authors have
the available records to good advantage.

The earliest recorded fires in Michigan occurre
1871, although presumably fires were common be
that date. Fragmentary records only are available
the period from that date to 1910. From 1911
State reports contain forest-fire statistics that are
accurate and untrustworthy for the early years
that gain steadily in reliability. For the period fr
1922 on the State's fire statistics are considered reas
ably accurate.

Some conception of the size of Michigan's fire pr
lem may be gained by a study of the number of f
and the acreage burned in each of the past nine ye
During that period the yearly total of fires repor
has varied from 538 to 4,690 with a rough average
2,250, and the area burned has varied from 38,
acres (in 1922) to 733,750 acres (in 1925). Approp
tions for fire-control purposes have increased stea
in the past 10 years. The funds available from
State and Federal Governments totaled $99,000 in 19
but in 1930 amounted to $401,655.

Part I of the bulletin is entitled "Physical a
Economic Conditions" and deals with topograp
climate, weather, soil, forest types, land ownersh
and values involved. Part II deals with the size a
importance of the fire problem and presents an analy
of nearly 15,000 individual fire reports. Part III te
how the forest fire division of the Michigan Departme
of Conservation is organized at present.

Forest land in Michigan requiring fire protection
als 20,650,000 acres. Of this area only about 10 per
t is publicly owned. The destructible timber values
olved total $300,000,000; the yearly cost of protec-
n is estimated at $500,000, or less than 0.2 of 1 per
t of that figure. The fire season in the State
ends from the time the snow leaves the ground in
spring until the heavy rains of the fall, roughly
m April 1 to October 30. The peak months in fire-
trol work are May, August, and October.

Fires in Michigan are almost all attributable to
nan carelessness. Land clearing and smoking are
leading causes of fires, each being responsible for
out 25 per cent of the total. Railroads are next in
portance, with 19 per cent, and camp fires fourth
h 17 per cent. Lightning causes less than 1 per
t of the fires; incendiarism is responsible for 4 per
t.

Four kinds of risk are recognized by the authors:
sk of starting, risk of spreading, risk of burning, and
k of loss. Here as elsewhere in forest-fire literature
sk of starting" means the relative likelihood of fires
rting expressed as the number of fires per year per
it of protected area. Risk of spreading refers to the
erage size of fires. Risk of burning is obtained by
iding the average area burned annually by the total
a under protection. Risk of loss is the average
nual loss per acre on the basis of total area protected.

The risk of fires starting is nearly twice as great in
e lower peninsula as in the upper. The risk of
reading is greater in the upper peninsula. The
k of burning is slightly larger in the lower peninsula.

The Michigan Department of Conservation, respon-
le for conserving forests, game, and fish, has divided
e State into 20 districts, each under the charge of a
strict warden who acts as the department's local
presentative in all the phases of its work. Until
27 the fire-control work consisted largely in fire
ppression alone, the district wardens having too
ge an administrative burden to give much time to
e prevention. A change in policy was made in 1927
fining the work of the district wardens more specifi-
lly and requiring that they give more attention to
e prevention. At the same time one assistant war-
n was appointed in each of the 15 fire districts, with
e prevention and control as his sole responsibility.
uring the six or eight month fire season the State
nploys towermen, special fire wardens, emergency
ecial fire wardens, fire bosses, and key men.

Special fire wardens receive a salary during their
riod of employment and are responsible for all pre-
ntion and suppression work within the areas assigned
them. In 1929 special fire wardens numbered 129
d the number of towers regularly manned by the
vision was 105, exclusive of towers on State forests.

Beginning in 1923, an experiment was made with the
e-boss plan of organization. Fire bosses were paid
a retainer fee of $25 per month in addition to an hourly rate on fires. The fire suppression crew members under the boss were paid 40 cents per hour of actual fire work. At one time there were 39 such fire bosses, with 317 company members. Of late this type of organization has lost favor; in 1929 there were only 10 fire bosses. Michigan's experience with this form of organization is similar to that of other Eastern States. Wherever it has been tried, apparently, the expenditure of funds in retainer fees paid to nonsalaried wardens has not brought about a commensurate betterment of service.

Key men selected by the special fire wardens are assigned to the protection of small areas in the vicinity of their homes. They are not paid a regular salary but are paid on an hourly basis for actual fire-suppression work.

In 1930 the organization was strengthened through the addition of another year-long fire man to each forest fire district, to assist in inspection and organization work.

The forest fire division maintains in cooperation with the United States Forest Service an experiment station for the study of all phases of fire control and of fire damage.

In presenting this picture of conditions in an important forest State the authors have made a substantial contribution to the growing literature on the forest-fire problem.

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◆

The question "Whose property is wild game?" is dealt with historically in a booklet recently published by the game conservation department of E. I. du Pont de Nemours & Co. (Inc.), of Wilmington, Del., under the title "Wild Game—Its Legal Status." The book is a reprint of a report made to the Massachusetts Fish and Game Association by the association's attorney. Copies will be distributed by the Du Pont Co. without charge as long as its supply lasts.

U. S. GOVERNMENT PRINTING OFFICE: 1931

FOREST WORKER

November, 1931

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UNITED STATES DEPARTMENT OF AGRICULTURE

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Announcements

Forest Research Fellowships Offered by National Research Council

Applications for National Research Council fellowships in the biological sciences, including forestry, for the year 1932–33 will be considered by a board of the council the first week in February if received before December 15, 1931, and at a meeting held in the spring if received between that date and March 15, 1932. The fellowships are open to citizens of the United States and Canada, of both sexes, who possess the Ph. D. degree or have done work equivalent to that required for the degree. The purpose is to promote fundamental research through the development of thoroughly trained investigators. At present it is the board's policy to restrict appointment to applicants in the early stages of a research career who have demonstrated ability of a high order and who give promise of developing individual judgment and point of view in investigative work. Appointments are for one year only, but may be renewed. The choice of place to work rests with the fellow, subject to the approval of the board. The basic stipends awarded per annum are $1,800 for unmarried fellows and $2,300 for married fellows in America, and $1,800 and $2,400, respectively, with additional travel allowance, for unmarried and married fellows appointed to study in Europe.

Requests for further information in regard to these fellowships should be addressed to the Chairman, Board of National Research Fellowships in the Biological Sciences, National Research Council, Washington, D. C.

Pack Forestry Fellowships Availabl

From six to eight fellowships are available for aw
by the Charles Lathrop Pack Forest Education Bo
for the year 1932–33. The purpose of the fellows
is "to encourage men who have shown unusual i
lectual and personal qualities to obtain training
will best equip them for responsible work either in
general practice of forestry, in the forest industries
the teaching of forestry, in forest research, or in
development of public forest policy." No restricti
are made as to age, educational status, or pract
experience; ordinarily, however, fellowships will
granted only to those who have completed an un
graduate college course or its equivalent, and only
American or Canadian citizens. Grants may be m
for study at a school of forestry or an institute of
search, on a forest under management, in associat
with forest industries, or in travel. In general,
grants will range from $500 to $1,800.

Applications must be made to the secretary of
board, at 1214 Sixteenth Street, Washington, D. C.,
January 1, 1932. The prescribed application form
be mailed by the secretary on request.

Pacific Science Congress Postponed

The Canadian National Research Council has
nounced that on account of the disturbed conditi
prevailing throughout the world the Government
Canada has deemed it best to postpone for a year
Fifth Pacific Science Congress, which was to have b
held under the council's auspices May 23–June 4, 1
in Victoria and Vancouver, British Columbia.

The Forest Worker is published by the Forest Service, United States Department of Agriculture, Washington, D. C. Jean Kerr, editor. Material offered for publication in the Forest Worker should be addressed to the editor.

Because the free edition is necessarily limited, this periodical can be distributed without charge outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

FOREST WORKER

Vashington, D. C. NOVEMBER, 1931 Vol. 7, No. 6

State Forestry

ontrol Measures Against Forest Insects

By Henry B. Peirson, State Entomologist, Maine

Ten years of experience in forest insect control work arried on by the Maine Forest Service has repeatedly onfirmed the belief that insect outbreaks, like fire, can e controlled if located in time.

Maine was the first State in the Union to start a fire-ookout service, and the system has been built up so that -day practically all of the 15,000,000 acres of forest nd in the State is covered by lookouts and patrolmen. Vith this efficient, well-established service already on e ground it has been just another step forward to rganize the men to report on insect outbreaks. By eans of illustrated booklets, personal contact, and the nest of cooperation from the men in the field, promising esults are being obtained.

The men are furnished with addressed mailing tubes which to mail specimens, and report blanks that over the points essential to a satisfactory diagnosis of e reported outbreak. It has been found that personal ontact with the men, showing them in the field the ifferent types of insects and their work, is the most ssential part of the project. This phase of the work ust be continually followed up.

Local outbreaks can almost invariably be controlled y cutting the timber on the infested areas or, in favorble cases, by spraying. The present year has seen cal outbreaks of several foreign pests which are being amped out before they assume epidemic form.

In one case an entire town is cooperating through wn funds, the local nursery, and private estate wners. Outbreaks of native insects which are likely prove serious are being controlled largely through utting. This would be impossible were it not for the terest shown by the lumber and pulp companies d other landowners. Outbreaks are carefully outed and reports with recommendations sent to e owners of the property. Almost invariably these commendations are followed.

Widespread outbreaks that have invaded Maine om the Canadian Provinces or from the other New ngland States are being combated by the use of parsites, spraying, and embargoes. The Maine Forest ervice maintains a laboratory where parasites are ised and where life-history and control studies are carried on. Each year sees new methods of control worked out.

There are many old beliefs in regard to insect outbreaks that must gradually be changed in the minds of technical foresters and others whose work carries them into the woods. The forest schools of the country could do much in correcting these falsities and in building up a basic working knowledge of insect control. There is always a reason for outbreaks starting, and under proper forest management many of these causes can be eliminated. Observations indicate that outbreaks invariably start up in isolated spots and not simultaneously over wide areas as is so often believed, although a single year may see many small outbreaks of the same insect.

Many persons believe that insect outbreaks after starting up run for a few years and then die down naturally. This belief has probably done more harm than any other one factor, for it has a tendency to cause people to look on an outbreak as a storm that can not be stopped. Outbreaks do not stop without some reason, such as lack of food, climatic conditions, parasites, or control measures employed by man.

The average annual loss from forest insect outbreaks in Maine has been approximately $3,000,000, according to an estimate based on the very lowest of stumpage valuations. It is believed that this loss can be brought down to a very low figure and kept there. The adoption of forest insect control work by all States would, it is believed, greatly reduce the Nation's forest insect losses, now estimated at about $150,000,000 yearly, and by utilizing the fire-prevention systems which the States and the Federal Government already have in operation the cost of the work could be kept very low.

❦

Plantings of black walnut have failed nine times out of ten in Pennsylvania, where the species has been planted extensively, according to conclusions reported by Thomas C. Williams, assistant forester, Sproul forest district. Field studies by the Pennsylvania Department of Forests and Waters have shown clearly that only the very best soils will produce successful black walnut plantations, and that the planting should be confined to fertile agricultural valleys in the southern and eastern sections of the State.

Wisconsin's Cooperative Plan for Stabilizing Lumber Industries

By Bernard Frank, United States Forest Service

"Regular employment of seasonal workers in the logging industry and the steady employment of workers normally employed in saw mills are among the first responsibilities of the lumber industry, and are of vital importance not only to the industry but to those who earn their living in other industries, to taxpayers, and to the State. Steady employment, the rational use of natural resources, fair practices and reasonable profits, and social and political stability, would be promoted by better planned and more orderly production. As a first step toward more orderly production, manufacturers of lumber in Wisconsin sign this agreement and invite the cooperation of the State on the terms herein set forth.

"* * * We, therefore, agree one with the other, not for the purpose of price fixing or individual commercial advantage, but for the reasons above stated, that for the period between July 1, 1931, and July 1, 1932, the production of each one of us will not exceed 28 per cent of our average annual production for the years 1927, 1928, and 1929."

So reads in part a recently approved contract between the State of Wisconsin and the hardwood and hemlock producers, marking a further advance in the efforts of a "socially minded" State toward the cooperative stabilization of its industries. It is the outcome of conferences between the governor and leading lumbermen extending over the past 10 months.

The need is obvious. A shutdown of the mills in any community would have serious economic and social consequences. Despite curtailment of production by Wisconsin and Michigan mills in 1930 and the first half of 1931, mill stocks on July 1, 1931, were 111 per cent of those on July 1, 1930. The aggregate shipments for the 12 months ending June 30, 1931, were lower than those for any similar period on record. At the current rate of shipment the present supply of either hemlock or hardwoods, which amounts to 150 per cent of the past year's production, is sufficient for two years.

The fulfillment of the terms of the contract is being supervised by a committee of seven representative lumbermen headed by O. T. Swan. An advisory committee of five has been approved by the Wisconsin Department of Agriculture and Markets, with the following membership: A. J. Altmeyer, secretary, State industrial commission; Harry Jerome and Chris L. Christensen, University of Wisconsin; Louis Schreiber, banker; and Hawley Wilbur, retail lumberman.

Current statistics on production, shipments, and market conditions are made available to the executive committee to enable it to adjust production either upward or downward. The advisory committee will see to it that no unreasonable practices in restra trade are instituted. "Whenever, in the judgme this committee, the common and public interest not being promoted by the operation of the agreer the committee shall have power, after consultation the committee of seven, by written notice to mer of the committee of seven, to declare it at an enc withdraw the cooperation of the State."

The participants in this agreement include a maj of the lumbermen in Wisconsin, representing more 75 per cent of the State lumber production by vol

While this action involves only a small fraction c total national lumber output, as an experimer applying to the lumber industry the principle planned production it has unquestionable signific

Blue-Ribbon Plots

Blue "ribbons" of paint are being used to mark trees chosen to form the final timber crop on cer areas of the Connecticut State forests. The pra was adopted this year on the suggestion of Josep Illick, now professor of forest management in the York State College of Forestry, who recalled that b of yellow paint are used to mark the crop trees on Heidelberg Communal Forest, Germany. It has l put into effect on 14 or 15 plots of ½ to 1 acre eac State forests and on 6 plots on private timberland h ings. In each case from 50 to 100 trees per acre l been chosen to be left standing until they reach an of about 100 years. After the banding of the trees the plots have been thinned so as to give t trees better conditions for development, and fu thinnings or other cultural operations will be car out with the same purpose. Rather complete meas ments have been made on the crop trees, and the pla to repeat these measurements periodically.

It is planned to put up a sign along the road at e of these plots for the information of the public. plots stand out very strikingly as seen from the ro and it is hoped that they will have an effect in leac private timberland owners to adopt the practice selecting crop trees.

The State forestry department offers to examine acre of forest chosen by any fire warden and if a su cient number of the trees meet its requirements establish a plot and band the trees with blue pai In such cases the owner is required to agree that he leave the blue-ribbon trees standing long enough permit measurement of five years' growth.

* * *

Trees grown in the Idaho State forest nursery th were sold in 1931 for use in establishing farm woo lands, shelter belts, and windbreaks numbered 75,0 of which 44,000 were black locust and 9,760 we Siberian elm.

regon Enlarges Forestry Appropria-tions and Legislates for Reforestation of Tax-Delinquent Lands

Oregon forestry appropriations approved in 1931 for coming year total $133,800, including an addition of 5,000 for the administration of the State reforestation v and for educational work.

Legislation of the year provides that counties may nsfer to the State title to forest lands that have en foreclosed for taxes and on which the required lemption period has expired. The State undertakes such cases to pay the county an annual fee of 5 cents r acre while the land is reforesting and 12½ per cent the gross revenue from the land. (These are the rates established by the Oregon reforestation law.) ne remaining revenue will revert to the school fund. other new law gives the governor power during riods of extreme drought to close forest areas to all ms of use or to forbid entry to such areas except der permit binding the entrant to comply with cer-n fire-prevention regulations. This measure re-aces a law, recently declared unconstitutional, which rmitted the governor to close the hunting season ring periods of excessive fire danger.

Michigan Forest Tax Law Amended

Michigan's commercial forest reserve act of 1925, ich provides for special taxation of lands stocked th immature forest growth and devoted to the pro-ction of merchantable timber, has been amended ective September 15, 1931, so that its provisions y now be brought to bear on lands that, although t sufficiently well stocked with young timber growth meet the requirements of the law if considered by emselves, are essential to the proper development of est property accepted for listing under the law. ne severance tax on the products of land listed under law is reduced, also, from 25 per cent to 10 per cent the stumpage value of the timber removed.

The requirement that a fee of 5 cents per acre per ar be paid when lands are withdrawn from classifica-n now applies regardless of how long the land has en classified, and to this is joined a 10 per cent yield . Formerly, a fee of 10 cents per acre per year in dition to the basic 5-cent fee was required if land was thdrawn 15 to 25 years (inclusive) after classifica-n, and in lieu of these two fees a 30 per cent stumpage was levied if the withdrawal took place 26 years or ger after classification.

Additions to the original act give the landowner the vilege of appealing to the circuit court from any cision made by the department of conservation under act; allow the owner free use of wood cut for domes- purposes; give the conservation department access the lands and to books of the operator for the purpose determining the accuracy of reports on cutting; and give the owner the right to withdraw without penalty in case the fees or taxes are so changed as to increase his burden.

A few weeks before the amendments to this law became effective the acreage listed under the law totaled 72,701. At that time the department of conservation had rejected applications for the listing of 68,441 acres and was considering applications covering approximately 20,000 acres.

New Fire Equipment for Wisconsin

Orders and requisitions for 14 new forest-protection trucks and 22 gasoline power water pumpers were issued in 1931 by the Wisconsin Conservation Commission, with the expectation that the new equipment would be available for use during the fall fire season of this year. One half-ton truck was ordered for each of the 11 forest-protection districts. Three 1½-ton trucks were ordered to fill the quota of at least two trucks of this type for each of the forest-protection districts, which average 1,200,000 acres. The new gasoline power pumpers, of which two were ordered for each district, are of two sizes, with capacities of 47 gallons and 88 gallons, respectively, per minute. Some of these are replacements.

Another order was for 36,800 feet of 2½-inch hose, to be distributed among the districts.

A unit consisting of a truck motor, a 300-gallon-per-minute centrifugal pump, and a trailer was ordered by the commission for use in fighting peat fires. It is so designed that there can be one outlet carrying 1,500 feet of 2½-inch hose, or two outlets each of which supplies water to 750 feet of 2½-inch hose. It is possible also by the use of reducing Siamese couplings to take two leads of 1½-inch hose from the end of each of the other leads. Throughout the peat districts there are drainage ditches from which this unit can be supplied with water. The unit will be stationed between districts 10 and 11 in the central part of the State and will be used in both districts.

In addition to this motor equipment, the State's increased forestry appropriation enabled the commission to order several hundred additional hand tools in time for the fall season.

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The Georgia Forest Service has announced the formation this fall of the Big Bend Timber Protective Organization, embracing 35,000 acres in Charlton County, and the Kinderlou Timber Protective Organization, embracing 17,500 acres in western Lowndes County.

◆

Attala County, Miss., has been added to the area protected from forest fire by the Mississippi Forest Service in cooperation with landowners and counties. The county contains 359,000 acres of potential forest land.

Hemlock Deaths in Pennsylvania Attributed to Drought

Many hemlock trees have died in Pennsylvania during the past year, report George S. Perry and J. N. Knull, of the Pennsylvania Forest Research Institute, who attribute the deaths largely to the 1930–31 drought. The loss appears to be heaviest on red shaly slopes in Perry, Juniata, Snyder, and Union Counties, where on many areas with a southern exposure more than nine-tenths of the hemlock trees are dead. Trees are dying also in shallow soil on warmer sites in Pike, Monroe, and Luzerne Counties. Even in the Black Forest region—Potter, Lycoming, Elk, and McKean Counties—"where hemlock originally was at its best," small hemlocks have died and many hemlocks have dead tops.

In most woodlands and forest areas the trees were not observed to be dying during 1930. The theory that drought was the chief cause of the deaths is compatible with this fact because the foliage of evergreens is slow to change color or drop following the death of the trees, and also because trees weakened but not killed by drought are subject to the attack of the spotted hemlock borer and may die of the combination of the two causes years after the drought occurs.

Two conclusions may be reached, say Messrs. Perry and Knull: "(1) Hemlock is a tree primarily suited to cool, moist soils, which in the better second growth forests occurs on northerly slopes and sheltered valleys. (2) Because hemlock once flourished on given areas does not indicate that it will grow there successfully now. Recurrent forest fires, open exposure to sun and wind, with completely changed vegetation and soil litter conditions, very often render sites far less acceptable to this sensitive tree than was the case in the original forest."

* * *

Citizens and organizations of Berks County, Pa., have already planted 1,232,543 trees, which they plan to dedicate next year as George Washington Bicentennial trees. The 160 agencies and individuals reporting bicentennial plantings include churches, schools, Boy Scout organizations, hospitals, and garden clubs.

* * *

Taylor County, Wis., has dedicated a George Washington Memorial Forest of 1,600 acres, near Medford, Wis. The land was deeded to the county especially for this purpose. About 75,000 Norway pine and northern white pine seedlings were planted this fall on 120 acres of the tract, and trees will be planted on the remainder as funds become available. As a feature of the dedicatory exercises the first of the memorial trees was planted by E. L. Urquhart, the 85-year-old chairman of the Taylor County board, who logged over that part of the country about 50 years ago.

Illinois County Forests

By Lewis B. Springer, Illinois Division of Forestry

The forest preserve act of Illinois, passed about 1 provided a way for counties to acquire small or la tracts for recreational purposes. Several count including Cook, Will, Du Page, Kane, and Winneba have taken advantage of this law and, altogether, plan is working out well to supplement State and nicipal forests.

Cook County took advantage of the act ab 1914. Its forest preserve district now consists about 34,000 acres of picturesque woodlands, w lakes, rivers, hills, and bridle paths, encircling entire city of Chicago, and provides outdoor recreat for all who care to use it. Visitors total five or million yearly. Every available form of outd entertainment is provided for in the preserves. Th are camping facilities, swimming, fishing, boati bathing, athletic fields, tennis courts, and picnick spots; concrete roads winding in and out through various tracts; drinking fountains, comfort static and shelters. Baseball diamonds are laid out in nea every section, and golf links are being constructed fast as the demand requires. Tempting trails le into the heart of the preserves. The preserves are u in the winter months as much as in summer, p viding skating on the river, tobogganing, and snc shoeing. A new ski slide has been built at Palos, j west of Swallow Cliff.

The Cook County preserves are rich also in histori background. The Palos hills contain the ruins French forts established in the days when the Fren explorers and their soldiers were contesting with t Indians. There are ruins of Indian villages througho the Desplaines River Valley. The Portage Prese marks the spot where Indians and French voyage launched their canoes, and on the beautiful Beve Hills section the Indians once maintained a signal tow More than a hundred years ago this playground wa battlefield.

The people of Winnebago County voted in 1922 establish a forest preserve district. The county n has eight forest areas of good size, including Hononeg Park, Laona Heights, Sugar River Preserve, Kilbu Bluffs, and Kishwaukee Bluffs on both banks of t Kishwaukee River. Visitors to the Winnebago Coun forest preserves in 1930 numbered 750,000, and it estimated that in 1931 they have exceeded 1,000,0 Tauge G. Lindquist, a forestry graduate of the Mic gan Agricultural College, is forester of the Winneba County forest preserves, with headquarters at Roc ford. Mr. Lindquist has a county nursery that ran with many State nurseries. Operating expenses a the financing of purchases of new land are provided f by a ½-mill tax.

Kane, Will, and Du Page Counties have coun forests totaling several hundred acres, organized a managed in much the same way.

Forest Fires of 1930

In the calendar year 1930 forest fires burned over 09,320 acres of the land in the United States[1] for ich fire protection was provided by the State govern-nts and by the United States Forest Service, accord- to a summary of reports made by State foresters d national forest supervisors. This constitutes 1.46 cent of the total area, 399,141,870 acres, so protected ring the year.

Land in need of fire protection but not protected ring 1930 amounted, according to the estimates of ate foresters, to 208,779,060 acres. Of this area, it roughly calculated, fires during 1930 burned over out 46,457,000 acres.

Direct damage by forest fires was officially estimated $14,597,280 on protected areas and at $51,371,070 unprotected areas.

When the fires of 1930 on protected lands were classi- l according to reported cause, smokers were again licated as the leading cause, being held responsible 17,460 fires. The number of fires reported as of endiary origin mounted to 14,394, as compared h an average of 7,638 so reported for each of the e years 1926–1930. Fires reported as caused by oris burning totaled 9,180, or 3,578 more than the ear average. It was reported that lightning caused 17 fires on protected land; campers, 5,011; railroads, 25; and lumbering, 1,626. Fires on protected land it were listed as of unknown origin totaled 6,332.

os Angeles County Forestry in 1930–31

The Los Angeles County Forestry Department ring the fiscal year 1930–31 operated on budgets terially reduced below those of the preceding year, t received a special appropriation of $25,000 to assist relieving unemployment. Men employed with this propriation did excellent work for the reduction of hazards on mountainous public roads and in main-ance of firebreaks, reports County Forester Spence Turner.

Forestation work carried out by the department ring the year included six experimental plantings l only two general field plantings, about 27,000 trees 50 different species being used. The experiments gun during the year have to do with species, size, l age of stock, types of planting, and differences in vation, site, and exposure. Some plots of selected ive brush species were started and some direct ding was done. Trees distributed to individuals planting on major watersheds totaled 21,676.

Ornamental forestry work of the department during year included trimming 44,685 trees on county hways. Mistletoe-eradication operations by the department at Big Pine Camp, under appropriations made available in 1930 by the board of supervisors, involved work on 2,279 oaks and 610 pines and the felling of 135 trees.

Records of the number of days per month on which the relative humidity was below 30° indicated that the lowest humidity prevailed in the months of October, November, December, and March.

During the year the department acquired two fire trucks having 250-gallon water tanks and two with 600-gallon tanks, and equipped all division squad trucks with 120-gallon water tanks in unit with Barton pumps. It also installed twelve 5,000-gallon water tanks at advantageous locations on brush-covered areas throughout the county where water was not immediately available. A lookout tower was constructed on county property on Pacoima Peak.

◆

Near the city of Griffin, in Spalding County, Ga., is a plantation of loblolly and shortleaf pines which increment borings have shown to be about 35 years of age, reports Assistant State Forester E. B. Stone, jr. A recent cruise of the plantation showed 17,544 board feet of pine and 1,500 board feet of red gum to the acre, indicating that the average yearly growth per acre has been 544 board feet.

◆

Savannah, Ga., has been selected as the site for the paper research laboratory for which the Chemical Foundation of New York has contributed $50,000 and the Georgia Legislature has appropriated $40,000 to be used in 1932 and 1933. Charles H. Herty will direct the work of the laboratory.

◆

Through a succession of years during which acorns from one *Quercus nigra* only have been planted in certain seed beds of the Louisiana State forest nursery there have developed in these beds a number of seedlings having the typical leaf form of *Quercus phellos* and *Quercus laurifolia*, reports Charles Delaney, who has done the planting. Some of these seedlings have been under Mr. Delaney's observation for as long as five years, and have preserved their diverse leaf characteristics to that age.

◆

North Carolina has abandoned the system of maintaining different deer and squirrel hunting seasons in different parts of the State. The uniform seasons now fixed are September 15 to January 1 for deer and September 1 to December 31 for squirrel. The season for taking fur-bearing animals including mink, skunk, otter, and muskrat has likewise been made uniform throughout the State, extending from November 15 to February 15. Raccoon and opossum may be hunted with dogs and gun beginning October 1.

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[1] Figures given in this article are for continental United States exclusive laska. Figures for areas protected or needing to be protected from include together with forested lands other lands, intermingled with djoining them, fires on which would endanger forests.

State Forests for Watershed Protection

Reporting for the Connecticut Geological and Natural History Survey on an investigation of the potable water resources of the State, made in pursuance of an act of the Connecticut General Assembly approved in 1925, Roscoe H. Suttie, associate professor of civil engineering in Yale University, wrote in part as follows:

> As our cities increase in population it will be necessary for them to obtain their water supplies from more and more distant watersheds. Eventually private companies may not be able to acquire all of the land necessary for watershed protection or to police it properly. There are at present thousands of acres of rough land unsuited for farming or suburban development which, properly forested and under public control, could be made to serve for watershed protection. The timber produced on these areas would help meet the impending timber shortage. The State now owns proximately 36,000 acres of forest lands. To comp the program as outlined by the Connecticut S Park and Forest Commission requires the purcl within a few years of 200,000 acres more. There i incompatibility between State forests and watersl for water supply.
>
> The advantages of State forests in providing par the lumber needs and wild life protection are understood. The advantages of State forests as a s guard for water supplies are not as much apprecia State forests will not only protect against pollu but also equalize stream flow, diminish the violenc freshets, increase low water flow, and prevent eros and silting of the streams.
>
> Two hundred thousand acres so located as to fur drainage area and storage for water supply wo provide a supply for about 1,500,000 additio people * * *.
>
> In consideration of purchase areas for the St forests, future water supply might well be gi weight.

Education and Extension

Michigan State College Measures Growth of Planted Conifers

Data on the growth rates of planted western yellow pine, northern white pine, and Norway spruce, and on the spacing desirable for trees of these species, have become available to the Michigan State College of Agriculture because of a planting made at the college in 1914 for the purpose of holding very sandy soil in place. The classes of stock planted were as follows: Western yellow pine, 2-year seedlings; northern white pine, 6-year transplants; and Norway spruce, 4-year transplants. The spacing was 4 feet by 4 feet. Moisture conditions differ greatly from the bottom to the top of the slope on which the trees were planted. When R. H. Westveld, assistant professor of forestry in the college, measured about 100 trees of each species in 1930, he obtained the following averages:

	Western yellow pine	Northern white pine	Norway spruce
Total height in feet:			
Lower slope	21.7	23.3	21.8
Upper slope	18.7	19.6	11.1
Diameter at breast height in inches			
Lower slope	4.4	4.0	3.0
Upper slope	4.1	3.4	2.1

In 1930 the maximum diameters for the three species were as follows: Western yellow pine, 6.9 inches; northern white pine, 7.2 inches; Norway spruce, 4.9 inches.

The western yellow pine had developed wider-spreading crowns than the other species. The trees of this species were crowding each other to such a degree that some of them had already died and thinning was needed, especially on the lower slop The Norway spruces had developed narrow crowns tl as yet were not crowding each other, and would need a thinning until at least 1935. The northe white pine showed a crown development intermedi between those of the two other species.

Farm Forestry in Northern New Hampshire

A farm forestry survey of Coos and Grafton Counti N. H., has been made by Assistant County Agent C. Herr and has led him to the following conclusions:

Woodland composes 52 per cent of the average nort ern New Hampshire farm in comparison with 18 p cent devoted to crops and 30 per cent to pasture. the average farm income 24 per cent is direct attributable to the wood lot, as compared with per cent obtained through the dairy industry. T average annual farm income includes $570 deriv from the direct sale of wood products and together wi this an indirect income from the wood lot amounti to $152. Spruce and fir make up 55 per cent of tl timber on the average northern New Hampshi wood lot.

* * *

Formation of a forest protective association Searcy County, Ark., is reported by Extension Forest Charles A. Gillett. Approximately 150 residents hav become members, pledging themselves to prote their woodlands from forest fires. The association wi carry on educational work designed to reduce the numbe of forest fires.

xtension Foresters of Nine States Meet at Ithaca

On September 1, 1931, extension foresters of nine ates met at Ithaca, N. Y., at the invitation of xtension Forester J. A. Cope, to spend two days in e field inspecting results of Mr. Cope's work. They ere accompanied by Lincoln C. Kelsey, State county ent leader, and by H. H. Horner, assistant commisoner of the New York State Department of Education. the two days the party visited nine forest manageent and planting demonstrations, a State game refuge at is being planted with trees as a typical example of e reforestation of abandoned farm land, and one of e State parks.

One 8-acre farm woodland seen has supplied 30 short rds of fuel wood per year for the past 20 years; that a little more than 1 standard cord per acre per year. he owner is justifiably proud of the money return he s obtained from the land and of the present condition the woods. Other exhibits were a planting of 10,000 ack locust trees all showing excellent growth as a sult of field crops having been grown on the land e first year; planted pines and hardwoods on steep d rough parts of a farm where a farm bureau forestry mmitteeman is setting an example to his neighbors; black locust plantation 17 years old that has produced excellent crop of fence posts, the returns averaging bout $5 per acre per year; and a 50-year-old Norway ruce plantation that has produced an average of 1½ rds of peeled wood per acre per year. On the second y the visitors saw a result demonstration by Donald and Lawrence J. Davidson, 4-H forestry club boys ing in Delaware County who have completed the ur years of forestry club work consisting of tree anting, forest appreciation studies, woodland mangement, and timber estimating. In Sullivan County ey got a first-hand view of the profitable commercial restry operations of George I. Treyz, who for the past years has used the clear-cutting system in harvesting me 200 acres of timber yearly for sawlogs and distillaon wood.

* * *

Registration at the New York State College of orestry this year reached a new total of 398, including 36 freshmen, 95 sophomores, 99 juniors, 41 seniors, d 27 graduate students. The marked change in the tio of juniors to seniors (last year the registraon in these two classes was 74 and 71, respectively) explained by the adoption of higher standards of lmission to the senior class.

* * *

Twenty-seven forestry seniors of the Iowa State ollege of Agriculture spent more than two months of e past summer on the Deschutes National Forest, Oreg. Professors Jeffers and Horning were in charge. The boys camped at Paulina Lake and made trips to practically all parts of the forest, particularly to the various logging operations. They helped fight a major fire (Tom Butte), and after the fire mapped the burned area and made a fire-damage cruise of it.

* * *

The School of Forestry of the University of Idaho has been elected to membership in the International Union of Forest Research Organizations. It is the eighth institution in the United States to enter this union, which has as its aim the promotion of international cooperation in the various branches of forest research.

* * *

Fifty-eight new students were enrolled in the forestry division of the University of California in the fall semester of 1931, bringing the division's total registration to 120. Of the new registrants 18 were graduate students and 14 were juniors.

* * *

A course in camp leadership is offered by the newly organized department of forest recreation and park engineering of the New York State College of Forestry. The course will be given by Fay Welch, who has had extensive experience in conducting camp-leadership courses at Columbia University and elsewhere and in directing summer camps for children.

* * *

Charles H. Herty is offering prizes totaling $175 to be awarded on the basis of forestry work of Georgia rural vocational schools during the present school year. An award of $100 is to be made to the school taking first rank in forestry work, and first and second prizes of $50 and $25, respectively, will be awarded to individual students.

* * *

Two 4-H forestry club boys of Scott County, Iowa—Kenneth Rueffer and Grover Hahn—won first place over all other agricultural demonstrators at the Mississippi Valley Fair and Exposition at Davenport, Iowa, with their booth and demonstration "Tree Planting is a Part of Erosion Control." Later they took their booth and demonstration to the Iowa State Fair and in competition with teams in poultry, livestock, dairy, and apiary work won first place in demonstration and third place for the booth. In the same class Horace New and Robert Proctor, of Story County, demonstrating windbreak tree planting, won first place for their booth and third place for the demonstration.

Forest Service Notes

Segregation of Sheep and Cattle on National Forest Ranges in Arizona

By Paul H. Roberts, United States Forest Service

The policy of segregating sheep and cattle on the Sitgreaves, Coconino, and Tusayan National Forests, in Arizona, was established by the Forester in 1925. Prior to that time the range had for the most part been utilized in common by the two classes of stock. Serious damage to forage plants and young trees, particularly western yellow pine seedling, was occurring as a result of overgrazing. Under the system of common use of the range it was not possible to fix responsibility for damage upon either class of stock. In order to relieve the overgrazing and the resultant damage to forage plants and trees the Forest Service had first planned to make material reductions in the numbers of stock using the forest ranges. Severe reductions were vigorously opposed by the stockmen, who had heavy investments in ranch headquarters and range improvements and to whom such reductions would, in many cases, mean financial loss. The segregation policy was decided upon by the Forest Service as a means of bettering range conditions while avoiding as far as possible severe reductions in numbers of live stock.

Control of livestock on the ranges was the first requisite of the new system. Sheep could be confined to designated areas by herders. To restrict cattle to their established allotments, however, required that controlling influences such as available water, forage requirements, and natural barriers be supplemented through the construction of many miles of drift fences between sheep and cattle ranges and of boundary fences to prevent stock on outside areas from drifting onto the national forests. Adjustments necessitated by segregation were worked out, fencing proceeded rapidly, and by 1927 the system was largely in effect. The adjustments were made in time to afford material protection to much of the yellow pine reproduction resulting from the heavy 1919 seedling crop. Refinements have been made annually since that time. Reductions have in some cases been made as first planned; in many cases it has been found that the reductions planned could be materially modified or that they were in fact unnecessary.

Important results of the system are as follows:

1. Control of stock on definite areas, the first essential of range management, has been brought about.

2. Control of the number of stock using a given range area, a second essential, has been very much improved.

3. Distribution of stock on the range is much improved. Concentration of large numbers of both classes of stock around particularly favorable permanent waters during dry periods is prevented.

4. Proper seasonal use can be obtained, through construction of a comparatively small quantity cross-fencing or through methods of management.

5. Administrative difficulties have been materia lessened. The permittee has an individual inter in his range, and is held responsible for conditi existing thereon. He therefore in most cases is am able to measures designed to keep his range in g condition and obviate the necessity of reductions numbers of stock, and voluntarily adopts such measu

6. The old system of imposing blanket reductions numbers of stock allowed to use the range, as a meas for the prevention of damage to trees and forage plar which resulted in organized resistance by large numb of stockmen, has been made unnecessary. Except cases of cattle on community ranges, necessary red tions are now imposed on the individual allotment permittee.

7. There is a general recognition by stockmen of t benefits to be derived from assignment to individ ranges, and a distinct tendency has developed on t part of the stockmen to favor breaking up large co munity cattle ranges into individual allotments.

Improvement in condition of forage and tree grow as a result of segregation has been far greater and m rapid than advocates of the system expected. In sp of the severe drought conditions that prevailed several seasons, in general the recovery of damag tree reproduction and forage cover has been remarkab The numerous advantages of segregation under t present degree of refinement of range manageme more than outweigh any arguments for dual use in t Southwest. It may be that in the future it will found advisable to rotate classes of stock on certa areas to provide for satisfactory utilization of so forage species that are not utilized by one or t other class of stock. Such species tend to crowd o herbaceous growth palatable to the class of stock the range or to grow in such abundance as to constitu a distinct fire hazard.

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Chemical analysis of samples of sweet birch co lected at various times during the 1930 season on t Tahoe National Forest, Calif., showed that the pe centage of protein decreased and the percentage nitrogen-free extract and fat increased with advanci stages of maturity. The percentage of phosphor declined steadily as the season advanced. T calcium content was found to have increased marked between August 2 and August 21, which was about t time when cattle were observed to leave the bir browse.

Mixed Stands Produce Pine Lumber of Higher Grade

By Benson H. Paul, United States Forest Service

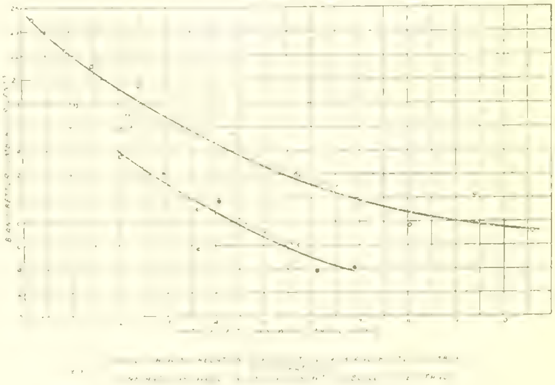
If a second-growth southern pine stand contains a ubstantial mixture of second-growth hardwoods of bout the same age as the pine, a higher proportion f the lumber is in the best grades than if the pine stand ad contained relatively few or no hardwoods in mixure, the Forest Products Laboratory has found.

The hardwoods exert a beneficial influence in causing n earlier natural pruning of the stems of the young ine trees. The broad-leaved trees cast a heavier hade than the pines and as a result hasten the death f the lower pine branches while the latter are yet of mall diameter. The small dead branches soon break ff and fall to the ground, leaving the lower portion f the pine stem smooth and clear of branches. When he irregularities left by the fallen branches have been overed over by the growth of the tree, the wood of ubsequent growth is clear and free from knots.

The development of mixed stands of hardwoods and ines in the southern pine region has been hindered in wo general ways. First, the grass fires which often urn through the forests kill back all hardwood trees o the ground, whereas many of the pine trees, on ccount of their thicker bark, are able to resist the heat nd survive. Under such conditions pine forests are kely to be open and understocked and, owing to the any branches of the trees, to produce only low-grade mber. The second circumstance that hinders the rowth of hardwood trees in second-growth pine stands a very dense initial seeding of the ground with pine. ecause the hardwoods start more slowly than the ine, dense seeding with pine prevents them from making satisfactory headway. In such a case the pine ees, although they may prune themselves fairly well, e too close together for satisfactory growth, and nless the stand is thinned the individual trees remain mall and for very many years do not attain a size suffiient to allow the separation of the thin, clear outer em portion from the inner portion containing knots, the manufacture of lumber.

Studies recently made in loblolly pine forests showed hat the highest lumber values were derived from ands in which from 20 to 25 per cent of the timber onsisted of second-growth hardwoods well distributed mong the pines. Under these conditions the hardoods helped to produce a more open stand of pine, y separating the pine trees, and assisted in the emoval of lateral branches from the pines by shading he lower portions of their trunks. The hardwoods, though of the same age as the pine trees, were not o tall as the pines, and this gave the upper portions of he pine-tree crowns abundant room for development.

The accompanying curves show the relation in two 0-year-old stands and one 52-year-old stand between he percentage of B and Better lumber cut and the basal-area ratio of pine to hardwood trees in the stands. In these stands, it was found, the percentage of B and Better lumber increased definitely as the proportion of hardwood trees increased. In general, however, according to the results of logging and milling studies conducted by the Forest Products Laboratory, the net value per acre of the stand is greatest in cases in which the ratio of pine to hardwood is about 4 to 1. A greater proportion of hardwoods results in a lower production of pine lumber and a smaller net value per acre, since the hardwood lumber is less valuable than the pine. With more valuable hardwood species or better hardwood markets this condition might be altered to some extent.



Other advantages accrue from growing hardwoods in mixture with pines. Hardwood leaves decay more readily than the resinous needles of pines and restore plant foods to the soil more quickly. Also, by absorbing and holding moisture the hardwood leaves assist in bringing about the disintegration of the pine needles and the formation of humus. Thus mixed stands maintain the forest soil in a more productive condition. In Europe for many years the cultivation of an understory of beech has been practiced as a means of maintaining soil fertility in coniferous stands.

* * *

Seed beds at the Feather River nursery of the California Forest Experiment Station that were treated with flour sulphur last year showed practically no losses from root rot during the season, whereas beds not so treated showed losses from this cause amounting to 21 per cent in western yellow pine and to 26 per cent in Jeffrey pine. The sulphur was used at the rate of one-half pound to 10 square feet of seed bed. In seed beds of western yellow pine and Jeffrey pine that were treated with a zinc sulphate solution (13 ounces in 6 gallons of water) immediately after they were sown and covered, a check at the end of May showed only about one-third as many weeds as in untreated beds and a check in the middle of June showed only one-half as many weeds as in untreated beds.

Forest Homesteads 24 Years After

By L. F. Kneipp, United States Forest Service

National forest officers of the Intermountain Region[2] have reported on a survey made in 1930 of national forest lands listed under the forest homestead act of June 11, 1906. This act provided for the classification, survey, and opening to entry of all lands within the national forests chiefly valuable for agricultural purposes and not needed for more important public purposes. The survey was confined to existing national forest lands, excluding areas eliminated from the forests since 1906. The figures given under different classifications do not seem to balance, but they broadly picture the trends of the forest-homestead policy. The high lights are as follows:

	Acres
Areas listed:	
Total	242, 078
Patented	152, 590
Pending entries	4, 812
Unentered	46, 107
Lists recalled	38, 569
Present agricultural use:	
Cleared	45, 185
Cultivated	28, 671
In orchard	234
In fenced pasture	75, 100
In unfenced pasture	27, 457
Unused	25, 940
Present occupancy of listed areas as homes:	
Original entryman—	
Yearlong	17, 768
Summer	8, 010
Succeeding entryman—	
Yearlong	3, 102
Summer	2, 366
Purchaser—	
Yearlong	20, 346
Summer	11, 083
Unoccupied as homes	94, 727
Present ownership of areas unoccupied as homes:	
Entryman	35, 115
Other farmer	15, 583
Stockgrower	28, 520
Public utility company	1, 743
Hotel, resort, or summer home	503
Mine operator	237
Bank or trust company	5, 375
Counties (through reversion)	4, 371
Unknown	3, 279
Present use of areas not occupied as homes:	
Farming and related grazing	25, 766
Grazing only	48, 559
Recreation	553
Mining	20
Unused	19, 828
Reasons for abandonment as homes:	
Inferiority of soil	2, 954
Soil exhaustion	1, 076
Lack of market	651
Better opportunities elsewhere	33, 850
Other	56, 195

The cost of the improvements on the listed tracts, exclusive of sawmills, stores, dance halls, swimming pools, and other structures not truly essential to l settlement and cultivation, is estimated at $922, Probably this estimate takes into account part of labor of the homesteaders. It does not, however, re sent the collective thousands of years of human life hope and fear expended in the process of settlem nor does it include the scores of thousands of dol expended from the Federal Treasury in examin classifying, reporting on, and surveying the listed ar

The Intermountain Region perhaps more than other in the West contains a population essenti agrarian in nature and tendencies, a class of pe better qualified and more disposed than the averag overcome the difficulties of homesteading. It is m than probable that the results of similar surveys other regions would be even less encouraging. Sc day, when there are fewer fires and timber sales land exchanges, these other regions should size up homestead situation in a comparable way.

Two Extremes of Forest Soil in Southeastern Alaska

By R. F. Taylor, United States Forest Service

In a region where two tree species commonly fo in mixture 95 per cent of the forests, it would se probable that one common soil type would be m desirable for the growth of either species. In sou eastern Alaska Sitka spruce and western hemlock fo in mixture about that percentage of the forests but dividually thrive best on types of soil that are far fr similar.

The more desirable Sitka spruce, favored by t Forest Service in natural regeneration, is seldom fou in pure stands over large areas except on lands recen uncovered by glacial recession. The everpresent he lock occurs in pure stands on the poorest sites, on whi raw humus and a thick podsol layer are characterist Young hemlock stands are apt to stagnate, and matu ones are less productive than mixtures of spruce a hemlock.

Sample quadrats and belt transects show that t optimum soil type for Sitka spruce reproduction co sists of glacial silt and gravel lightly covered by a mo formed of the débris of pioneer plants, mostly willow alders, and poplar. The character of this soil is goo but the quantity is not sufficient for fast growt Hemlock and spruce germinate with the first pioneer the hemlock dies out by the twentieth year, and a pu stand of spruce results. Such stands are common understocked and slow growing. The soil type mo favorable to pure hemlock stands lacks mineral sc and hardwood leaves. It consists of rotten woo ericaceous débris, undecayed litter, and raw humu It shows a podsol horizon. On this soil both speci germinate but hemlock is usually the lone survivo Between these two soil types lies the happy mediu for the species mixture.

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[2] The Intermountain Region includes Utah, southern Idaho, western Wyoming, Nevada, and northwestern Arizona.

Just what feature of the glacial soil prevents the mpetition of the hemlock is not known, nor do we iow why spruce can not tolerate an excessively acid onmineral soil. In investigations of soil conditions on eld study plots it has been found that the sites having ie fastest growth show a mixture of the two species in hich spruce forms at least 50 per cent by basal area, soil cover passing through a normal process of decay, nd a very thin podsol layer.

Having considered the two extremes, one might rescribe a mixture that should prove enticing to the esired Sitka spruce. To 5 parts of mineral soil add 3 arts of forest duff and humus and 2 parts of alder ull. Mix well and allow to lie in the sun. Such a ixture is often found on cut-over land along the gging roads and at the foot of slides. It produces oung stands having a high percentage of spruce and ster growth than anything observed on other soil pes. A thorough tearing up of the soil in logging iould do much toward producing faster-growing stands aving high percentages of spruce.

esults of Girdling to Release Pulpwood Timber Pay Costs in Two Years

Girdling of hardwoods to release pulpwood timber of erchantable size on an area in northeastern Maine has ought about a net profit of $2 per acre for each of the years since the girdling operation, according to an timate by Marinus Westveld, of the Northeastern orest Experiment Station. The operation was car- ed out in 1919 in a typical mixed spruce and northern ardwood stand on property of the Eastern Manu- cturing Co. near Patten, Me. Girdling of all hard- oods with breast-height diameters of 2 inches or more leased on each acre 40 spruces and firs having an erage diameter of 8 inches and an average volume of 72 cubic feet (2.8 cords). In 1930 the plot showed 050.4 cubic feet (11 cords) of merchantable pulpwood er acre; without the release operation, Mr. Westveld stimates, the yield would have been only 412 cubic feet .3 cords) per acre. Even during the first four years llowing the girdling, the pulpwood timber showed a owth greater by 115.2 cubic feet (1.2 cords) per acre ian could have been expected without the release peration. During that period the number of mer- iantable trees increased to 160 per acre.

In the 11-year period following girdling the annual owth of the pulpwood timber per acre showed a -fold increase—from ½ cord to ¾ cord.

The results of this experiment indicate that the costs girdling hardwoods to release pulpwood timber of ierchantable size in the Northeast may be more than paid by the additional growth put on by the latter the first two years following the girdling operation. hus a very short lapse of time may bring to an end ie danger that the investment in the release operation ill be lost through the necessity of cutting the timber ecause of fire or other damage.

Southern Woods for Paper Pulp

By Parker K. Baird, United States Forest Service

Since the beginning of 1930 about one-third of the activities of the pulp and paper section of the Forest Products Laboratory have been devoted to problems related to the utilization of southern woods. This work has been made possible through a special congressional appropriation.

Ever since the advent of wood into the pulp and paper industry as a substitute for rags, spruce has been king of the pulp mill. Now, however, his dethronement is under way and a democracy of pulpwood species is about to be declared. Research to determine the suitability of other woods for pulping has had the result that in spite of the cutting of great quantities of pulpwood in the United States our potential pulpwood stands are to-day more extensive than they were 20 years ago.

The principal pulp product of the South at present is of the kraft type, as produced by the old standard process. It is best fitted for such products as brown wrapping paper, bag paper, container board, and similar products. Inasmuch as the kraft process is alkaline, no difficulties due to resins and pitch are involved in pulping longleaf pine by this process. Standard kraft is very difficult to bleach, however; consequently strong white or light-colored papers can not be made from it. It can now be said that the South dominates the American kraft pulp industry.

The lower cost of wood in the South permits cheaper pulp production. In the past this advantage has been offset to some degree by the fact that papers made from southern tree species have not been quite up to the quality of those made from northern or imported species. This inferiority has been due to the nature of the fibers in the southern pines and also to the lack of technical control in the processing, which has resulted in a somewhat weaker and "wilder" sheet of paper. These characteristics are gradually being overcome, and eventually just as good paper should be made in the South as anywhere else. As soon as the South is able to make kraft paper of the same color and strength as that which is now being imported from Europe at the rate of 1,200 tons per day, apparently there will be no obstacle to its meeting in full the national demand for this commodity. So long as kraft pulp is the only paper product of the South, however, the situation will be economically dangerous; the South needs a diversified pulp industry.

About four years ago Congress made a special appropriation to the Forest Products Laboratory to investigate the pulping qualities of southern woods and particularly the possibilities of developing a strong, white paper from the southern yellow pines. The resulting investigations, confirming previous work, showed that southern yellow pine reduces to pulp best by the sulphate process. The sulphite, or acid pulping process, was found unsuitable for virgin longleaf pine. No marked success resulted from an attempt to grind longleaf pine for mechanical pulp.

In testing the kraft process on longleaf pine it has been found that increasing the proportion of cooking chemical to wood and using a greater proportion of cooking liquor than was previously employed results in a high yield of pulp that can be bleached, by a special process, without much loss in strength. This finding has been of decided value and is now used by one of the leading paper companies in the South.

Shortleaf pine can be used to make high-grade kraft wrapping paper, fiber board, and book stock. Very little experimental work has been done on shortleaf pine with any pulping process other than the standard kraft process.

Loblolly pine was the first of the southern pines on which pulping experiments were carried out at the Forest Products Laboratory. It was on this species that the first studies toward producing an easily bleachable kraft pulp were made. Strong white pulps suitable for bond, book, and other high-grade papers were obtained from loblolly, and it is understood that at least one southern mill is now using large quantities of this pulpwood in its mills and incorporating it in a book and bond sheet as a substitute for the spruce sulphite pulp formerly used. The mechanical pulping characteristics of loblolly pine are only fair, and much power is required to produce the pulp. This problem is being studied. Certain other characteristics, such as color, may require special consideration in the production of groundwood pulp from loblolly pine.

In the recent Forest Products Laboratory studies of the pulping qualities of southern pines special emphasis has been placed on slash pine. Several interesting and important developments have occurred in the pulping of slash pine by the standard pulping processes and also by modifications of the standard processes. It has been found that second-growth slash pine, which has very little heartwood, produces a pulp of excellent bleaching characteristics when treated by the modified kraft process developed by the laboratory. A bleached sulphite pulp suitable for bond and other white papers is produced from young second-growth slash pine by the standard sulphite process. Newsprint sheets containing 90 per cent of groundwood or a 50-50 mixture of groundwood and sulphite have been produced experimentally by the laboratory from young second-growth slash pine, which consists almost entirely in sapwood. There are indications that a new combination of pulping processes recently developed by the laboratory, in which impregnation with semichemical liquors precedes the standard lime sulphite cook, will make possible the satisfactory pulping of woods with a considerable proportion of heartwood.

Following the study of pine, experimental work has been done in the pulping of black and tupelo gum, including the use of special semipulping methods developed at the laboratory. Contrary to vi previously held, the sulphite process works very sa factorily on black and tupelo gum unless much da colored heartwood is present, yielding a fairly str pulp that bleaches easily to an excellent color. M book papers contain bleached spruce sulphite al with soda pulp usually made from aspen. Sulphit this combination gives a blue-white tint that the pa trade desires. It seems logical that book paper may made from the pines combined with gums and cert other southern hardwoods. Long-fibered pine p can take the place of spruce sulphite, and gum sulph can replace soda pulp, so that the desirable white co can be obtained. Recently excellent mechanical groundwood pulp has been produced from gum, wh together with other long-fibered pulps such as slash p sulphite have produced excellent rotogravure and bo paper.

A word of caution is in order in regard to proje directed toward the utilization of resinous woo For many years the paper industry has been bother periodically with pitch trouble on the paper machi This has occurred even with spruce wood. The ex cause of pitch trouble on the paper machine has nev been ascertained. Small pitch particles agglomera and form larger ones, which, upon coming through wi the fibers, may stick to the wire or couch rolls a produce holes in the paper or break it down entire bringing the operation to a halt until they are remove The shut-down of a paper plant for one hour a day as result of such troubles may mean the difference betwe profit and loss. Before it is attempted to initiate t manufacture of these experimental papers on a produ tion basis, therefore, we believe it advisable to make full mill-scale run for a considerable length of ti on the new cooking and grinding process develop at the laboratory.

The development of the pulp and paper indust in the South during the past few years has bee exceedingly rapid. The strange thing about th development is that it has been so long comin Apparently the delay has been due to the conservativ attitude of the paper manufacturers in not wanting t work with woods other than the familiar spruce unt they are forced to from economic considerations. No only does the South now contain a vast reservoir o pulpwood, but conditions in the region are favorab for maintaining this supply perpetually. The South capable of reproducing stands of wood suitable fo pulping purposes in approximately 25 years, a rat impossible elsewhere in the country except in th Pacific coast region.

The Forest Products Laboratory is continuing it technical pulping studies dealing with certain peculiar ties of longleaf, loblolly, and slash pine. It plans als to initiate studies on the suitability of addition southern species such as sand pine and shortleaf pin for pulp manufacture, to make further fundamenta emical studies on the nature and distribution of sins and pitch in the pines, and to attempt to elimi-te resin and pitch as a paper-making nuisance.

echnique of Tapping Pines for Heptane

Experiments of the California Forest Experiment ation in tapping Jeffrey and Digger pines for heptane vealed a 17 per cent decrease in the second-year yield mature trees. The yield of trees in the "blackjack" age, on the contrary, increased in the second year, y nearly the same percentage. It was found that the eld varies inversely with the width of the streak, long as the streak opens completely the plugged ouths of the resin ducts. A 1/16-inch streak accurately ade will open the ducts; with the hacks now available, however, the average workman can not cut a reak narrower than one-fourth inch. The yield creased as the depth of the streak was increased to a aximum of one-half inch. Angle of streak was found be unimportant.

Open cups showed consistently larger yields than vered cups, the average difference in contents being pproximately twice that which could be accounted for y the inclusion of trash in open cups. The use of p covers may nevertheless be profitable because of e expense involved in removing trash from oleoresin llected in open cups.

Faces of medium width gave the greatest yields. he yield of faces on south, west, and east exposures as about the same; that of faces on the north was ly about three-fourths as great.

Larger yields attended the use of aprons attached y 1-inch roofing nails to grooves in the bark than at of aprons inserted in ax cuts.

The tapping operation was not followed by intensi-cation or concentration of beetle attack on tapped ees.

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The cost of making 1,000 board feet of Douglas fir mber into logs is twice as great if the trees cut are nly 20 inches in diameter at breast height as if they e 58 inches in diameter at breast height, according the results of a Forest Service study involving an nalysis of 300 Douglas fir trees on representative mbering operations. Bucking costs showed a slight crease as diameters went above 48 inches, owing to creased breakage, which in many cases necessitates vo or three extra cuts to eliminate shattered portions. small trees breakage is less of a factor because it ccurs principally above the merchantable top.

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The California Forest Experiment Station reports at the 1931 crop of sugar pine seed is the heaviest nce 1920. In most localities in California white fir nd western yellow pine have failed to produce seed is year.

More About Gas from Trees

By R. R. Reynolds, United States Forest Service

The presence of inflammable gas in trees is a phenomenon not exactly new to foresters, although there may be a few who still "have their doubts." But the average man new to the woods would be about ready to streak for home if he were to observe some of the "gas attacks" during the increment boring of hardwoods in various parts of the South in connection with studies by the Southern Forest Experiment Station.

During timber growth studies in Hempstead County, Ark., in the summer of 1931, out of a total of about 100 bottom-land hardwoods measured and bored, at least 22 showed the presence of gas. In eight instances the gas emitted by these trees was plentiful enough to burn when a lighted match was applied at the handle of the increment borer.

In two different trees the gas was under such pressure that it came out literally "with a bang." The first time this happened, it so startled the man doing the boring that he jumped away from the tree. The noise sounded like the discharge of a Benjamin air rifle and was heard by another member of the party at a distance of 60 feet. When a lighted match was held to the head of the increment borer through which the gas was issuing the gas immediately caught fire. The flame, which was pale blue in color, shot out about 5 inches beyond the end of the instrument and burned for about two minutes. During this time a cigarette was lighted from it.

In this instance the tree was a willow oak (*Quercus phellos*). Gas was found to be present in different individuals of three other oaks (*Quercus nigra*, *Q. lyrata*, and *Q. alba*). Also, two instances of gas were found in red gum (*Liquidambar styraciflua* L.) and one in bigleaf shagbark hickory, locally known as kingnut hickory (*Hicoria laciniosa* (Michx. f.) Sarg.).

The gas in these trees apparently was held in or came up or down the tree in a relatively small space, since working the increment borer a fraction of a turn farther into the tree stopped the escape of gas through the borer. When the handle of the instrument was returned to its former position gas again began to escape.

The nature of the gas and the cause of its formation are apparently an unsettled question. If the gas is formed through decay, as seems probable, it may be that this takes place in the roots or in the lower part of the stem, the gas then coming up through the vessels to the point at which it is tapped by the increment borer.

In the case of the willow oak just described, several borings were made around the circumference of the tree tó determine whether there was any evidence of decay. Each of these borings went to the heart of the tree, and each core removed showed perfectly sound wood. In none of the other instances in which gas was observed did the cores show evidence of decay. In practically none was any evidence of decay apparent.

How to Make Photographs Identify Themselves

By C. A. Abell, United States Forest Service

In order that photographs taken in connection with forest research may be rapidly and accurately correlated with field notes, it is desirable that they include some means of identification for temporary numbering. When a great many pictures are to be made of more or less similar vegetation and the photographer is working without an assistant, such identification is practically indispensable.

A simple system that requires no special equipment was tried with satisfactory results last summer in photographing Georgia hardwoods. Each set of a dozen films was designated by a letter marked on the film box. Within the set, numbers 1 through 12 were indicated by a sheath knife stuck in one of the tree boles. The knife handle was placed in positions corresponding to hour points on a clock dial. To avoid confusion between consecutive numbers, the knife point was located differently for odd and even numbers. In picture number 1, for example, the knife point was at the edge of the visible portion of the tree trunk, but in picture number 2 it was at the center of the surface of the trunk as seen by the camera.

Other devices have been suggested such as a chart on the principle of the counting frame, or beads on a string. The use of these devices, however, would involve adding another piece of equipment to the already overflowing camera case, whereas the system just described enables the photographer to obtain the same result through the use of an inconspicuous article ordinarily at hand as a part of his personal equipment.

Northern White Pine Stumpage Prices in the Northeast, 1926–1930

By Henry B. Steer, United States Forest Service

Many inquiries have been received by the Forest Service concerning the effect of the present depression on stumpage prices, particularly on prices of northern white pine in New England. The opinion has been expressed locally that, owing partly to the general economic depression and partly to the competition of cheap box lumber from the Pacific Northwest, northern white pine stumpage values in New England have suffered a serious setback.

In this connection data on actual stumpage sales of northern white pine in New England and New York during the period 1926–1930, inclusive, obtained through the cooperation of the Bureau of the Census, have been compiled by the Division of Forest Economics of the Forest Service. These data were collected in precisely the same manner in each of the five years mentioned. They cover all the white pine reported to the Forest Service as sold in the seven States in each of the five years either in pure stands or in mixed stands in w the northern white pine was treated as an indivi species.

A few sales of virgin timber were reported, but estimated that at least 95 per cent of the timber invol was second growth.

The data on sales of northern white pine in the England States and New York during the y 1926–1929 are summarized as follows:

	Number of sales	Volume of stumpage sold (1,000 board feet)	Value	Average price per 1,000 board feet	Range prices 1,000 bo feet
1926	109	48, 673	$424, 785	$8. 73	$2. 00-$1
1927	102	44, 115	418, 494	9. 49	3. 00- 1
1928	121	42, 240	394, 912	9. 35	2. 75- 1
1929	130	50, 031	394, 052	7. 88	2. 76- 1

Data on such sales in 1930 are as follows:

State	Number of sales	Volume of stumpage sold (1,000 board feet)	Value	Average price per 1,000 board feet	Range prices 1,00 boar feet
Connecticut	5	315	$1, 795	$5. 70	$5. 00-$
Maine	46	17, 508	156, 830	8. 96	2. 00- 1
Massachusetts	37	7, 136	54, 433	7. 63	4. 00- 1
New Hampshire	34	39, 896	334, 686	8. 39	3. 00- 1
New York	7	313	2, 604	8. 32	5. 00- 1
Rhode Island	2	1, 369	11, 734	8. 57	6. 00-1
Vermont	10	1, 882	7. 885	4. 19	3. 00- 2
Total and average	141	68, 419	569, 967	8. 33	2. 00-2

Price range class	Number of sales	Volume of stumpage sold (1,000 board feet)	Value	Average price per 1,000 board feet	Percentage of total number of sales	Per cen age vol ume stum age sol
$2-$2.99	2	80	$160	$2. 00	1+	(1)
3-3.99	3	1, 460	4, 380	3. 00	2+	
4-4.99	9	2, 154	8, 686	4. 03	6+	
5-7.49	61	20, 490	116. 258	5. 67	43+	
7.50-9.99	35	10, 851	88, 985	8. 20	25	
10-14.99	28	31, 574	324, 098	10. 26	20	
15-19. 99	2	1, 760	26, 400	15. 00	1+	
20-24.99	1	50	1, 000	20. 00	1	(1)
Total and average	141	68, 419	569, 967	8. 33	100	1

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[1] Less than one-half of 1 per cent.

Although some fluctuation is evident in yearl averages of prices received for northern white pine i the Northeast in the five years 1926–1930, the averag prices received since the beginning of the general ec nomic depression do not show a marked reductio In 1930 only 5 per cent by volume of the white pin stumpage was sold at prices less than $5 per 1,000 fee and 49 per cent was sold at $10 or more per 1,000 fee

During the 5-year period there evidently was an creasing tendency in some parts of New England to t and manufacture no white pine other than that lding a large percentage of high-grade lumber. other parts of New England, however, reports indie growth of the practice of selling and manufactur- white pine as soon as the trees will produce a low de of box lumber.

ow the Southern Experiment Station Handles Pine Seed

The "standard sand flat" used by the Southern rest Experiment Station for germination tests with ed of southern pines is a wooden box, 10½ by 10½ by inches inside, filled with clean, moderately fine, ite sand. The sand is not sterilized in any way the st time it is used. If it is to be used a second time it heated to more than 100° C. for several hours. cept in special studies, the seed are not sterilized or erwise pretreated. A simple device contrived by o members of the station staff, P. C. Wakeley and A. Chapman, makes it possible to sow the seed ickly and with certainty that the desired number go o each drill. This is a 14 by 4 inch strip of galnized iron fitting over the flat. One edge is bent ward to form a "backstop" that prevents the seed m rolling off onto the flat. At the other edge is a slit, th edges turned downward, through which the seed, er being counted, are pressed into the drill by means a ruler. The seed are sown 200 or 250 to a flat, 25 to rill. Each drill is sown immediately over a ¾ by ¾ 10¼ inch trough of 1/16-inch mesh screen wire, imdded in the sand, which facilitates lifting the germinated seed for cutting tests.

The seed are covered only to a depth of one-eighth ch from their centers. Studies conducted by the ation have shown conclusively that southern pine ed covered with sand or soil to a depth of one-fourth ch or more, either in flats or in nursery beds, germite less quickly and in smaller proportions than those vered to less depth.

The wings of longleaf pine seed must be removed by nd before the tests are set up, both because of the nited size of the flats and because of the difficulty of vering the wings properly.

The seed are watered daily or as needed. The flats e examined every day, with the possible exception of ndays during the period of less active germination. erminating seed are pulled and recorded daily, to event errors arising from mortality due to damping f. Tweezers are used to raise the germinated seed. he radicle is not actually pulled out of the sand. ed are considered to have germinated when they mp up the sand enough so that they can readily be asped with the tweezers. A separate record is kept each row of seed, to facilitate statistical analysis.

The individual wire drill tray, which was designed at the suggestion of Mary G. Regan, of the station staff, reduces practically to zero the loss of ungerminated seed during lifting, and reduces to 5 or 10 minutes the time required for lifting and checking the seed from one flat, which would otherwise take from 30 to 45 minutes. When the sand has been scraped away from each seed tray in turn the tray is lifted from the flat and is lowered and raised in a pail of water until the remaining sand is washed away. Such trays can be cut and folded at the rate of 50 to 80 an hour and are inserted in the sand flat with very little expenditure of time and effort.

The method used by the southern station to extract seed from longleaf and loblolly pine cones, demonstrated by E. W. Hadley in 1925, is to dry the cones in lumber dry kilns at 120° F. and from 20 per cent to 30 per cent relative humidity. The process requires 16 hours or less.

In collecting pine cones a great deal of time is saved by throwing the cones into a half-bushel basket or half-bushel measure and then pouring them into a bag instead of trying to throw them into the bag as they are gathered. This suggestion came from Superintendent Bean, of the Kirbyville State Forest, Tex.

An old idea resurrected by Nathan D. Canterbury, formerly State forester of Louisiana, is that of removing the wings from southern pine seed by wetting. Except for longleaf pine, the seed of the southern pines are so constructed that the two "claws" of the wing which grip the seed relax when wet. Instead of painfully rubbing the seed by hand, or running it through a complicated winging machine, the station's practice is to wet it thoroughly, spread it on a canvas in the sun, and either knead it in a fold of the cloth or rake it vigorously with a stick at intervals during the drying process. (Incidentally, the first rain washes the newly fallen seed of all the southern pines but longleaf free from their wings and thus not only aids their downward passage through the grass but also makes them less conspicuous to birds. This can readily be proved with a watering can and a handful of freshly extracted seed.)

A recent practical development in methods of handling pine seed that has been adopted by the southern station is the use of a cleaning mill for removing empties.

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Longleaf pine seed stored in a paper bag at a temperature of 32° F. at the Southern Forest Experiment Station, New Orleans, La., germinated as promptly and as well at the end of a year's storage as fresh seed of the same lot. Within 35 days after the stored seed was sown 60 per cent of it had germinated. Seed of the same lot stored at room temperature for one year was slow in beginning to germinate and at the end of 40 days showed a germination percentage less than 25.

General Forest News

Causes of Decadence of Birch on Cut-Over Lands in New England

By **Perley Spaulding**, United States Bureau of Plant Industry, and **H. J. MacAloney**, United States Bureau of Entomology

In northern New England the cutting of merchantable timber from mixed stands often leaves a thin scattered stand of paper and yellow birch and other hardwoods. Within a few years after the cutting these residual birches decline and often die. This decadence has been attributed to the bronze birch borer, the shoestring fungus, and other causes. Studies which we undertook in 1930 to learn just what part the borer and the fungus actually play in the killing of such birches led to the following conclusions:

In the stands studied the bronze birch borer can not be considered a primary insect pest. There is ample evidence, however, that as decadence progresses the trees become more subject to attack and in many cases the borer is a contributing cause of death.

With our present knowledge the decadence of birch can not be attributed to any fungus as a primary cause. *Armillaria mellea* undoubtedly helps to destroy trees previously injured by other factors.

The yellow birches studied had been suppressed under an overmature stand for a long time. The sudden excessive opening subjected their uppermost twigs to light and heat to such a degree that the trees could not survive. The condition of the roots as revealed by our studies did not indicate marked inability to supply water, but the decided change in water conditions of the soil following the thinning may have prevented the roots from functioning to maximum capacity in dry times.

A remedy for the situation so far as it is influenced by organic factors consists in preventing mechanical injuries that would afford entry to the bronze birch borer and to *Armillaria mellea*.

In these stands the paper birch appears to have passed the age at which it could have sprouted readily. After a long period of growth decline, it was unable to come back. Its incipient decadence was aggravated by the sudden release.

It is suggested that in selective cutting none but relatively young trees be retained for future growth, especially in the case of paper birch, and that yellow birch stands be opened up only gradually. When trees to be left are selected on the basis of a diameter limit only, they may include individuals of slow growth that are too old to profit by release.

Studies of the physiological factors involved in the decadence of birch on cut-over lands have been made by R. C. Hall. In 1927 Doctor Hall began t studies in northern New England as an agent of Bureau of Entomology cooperating with the No eastern Forest Experiment Station. In 1929 he tinued on a cooperative basis with those organizat and the University of Michigan, working in nortl New England. In 1930 he continued the work in Lake States as an agent of the University of Michi His results have not yet been published.

An Instance of Natural Control of Southern Pine Beetle

By R. A. St. George, United States Bureau of Entomology

On several areas of the Pisgah National Forest, n Asheville, N. C., where second-growth shortleaf pitch pine trees were infested with the southern p beetle (*Dendroctonus frontalis* Zimm.), a rather hea spring emergence of the beetle was anticipated in 19 When I examined one of the areas on March 28, h ever, I found that a heavy emergence was not to t place. In fact, very few living beetles could be fou Apparently natural conditions had brought about control of this destructive insect.

Several workers have pointed out that a deficie of 1 inch or more in rainfall during the late summ and fall months creates conditions favorable to increase of the southern pine beetle. Practically epidemics of this insect in the past have occurred d ing periods of drought. The year 1930 will be kno not only as a record-breaking drought year but a as one favorable to beetle attack. According to Unit States Weather Bureau records, in the vicinity Asheville there was an accumulated rainfall deficien of 6.41 inches for the period from January 1 to Ap 1. This deficit increased by June 1 to 8.58 inch and by September 1 to 15.11 inches. The total defi for the 12 months ending December 31, 1930, w 15.81 inches. September and November were the or months with excess rainfall. Records obtained fro four stations in western North Carolina and four eastern Tennessee, mainly in the mountainous sectio reveal a rainfall deficiency for 1930 ranging from 6. to 13.97 inches. Timber losses during 1930 from inse damage were heavy in this area, particularly in t Smoky Mountains.

Temperature conditions during the late fall mont also were abnormal and favorable to brood develo ment. Ordinarily there is little insect activity in th region after the first week in October. During 193 however, the maximum temperature was above 60° almost every day during the entire month of Octobe l also during the period November 17–24. It is ieved that these warm periods hastened the developnt of the September broods sufficiently to cause ir transformation to adult beetles, and that, whereas se broods would normally have overwintered as æ and emerged in the spring of 1931, the greater t of them emerged late in the fall of 1930.

roups of trees over a large area were attacked late t fall. When the broods in these trees were examl on May 7, 1931, it was found that they had not rwintered successfully. Although adults had exded their galleries sufficiently to oviposit and a tiny larvæ had hatched, all stages (adults, eggs, larvæ) found during early May were dead. The son for this has not yet been determined; 7° F. the lowest temperature that occurred in the vicinity ing the winter of 1930–31, and although this temature was sufficiently low to account for the mortaliof the tiny larvæ it is not believed to have been ere enough to affect the eggs. Beal[3] found that s of the southern pine beetle, even in the outer k, survived temperatures of 2° F., at which the er stages succumbed. It is possible that the death he brood was due to an abnormally moist condition he inner bark, for the phloem appeared to be unally wet and soggy, probably owing to lessened nspiration during the winter months.

he activities of the hairy woodpecker are thought have had a part in the natural control of these ods of the southern pine beetle. It was observed September 3, 1930, that woodpeckers had already un to attack the developing broods on one plot of trees. Of these trees 244 had been attacked retly, so that the broods present in them were not yet iciently developed to attract woodpeckers. On 120 he remaining 302 trees the birds stripped off from o 50 per cent of the outer bark in order to reach the turing larvæ and pupæ, thereby affecting a much ger percentage of the brood than they actually conned. The warm weather during the late fall brought out a rapid development of the beetles in the 244 es that had been attacked recently. As the food ply became more plentiful the woodpeckers must e assembled in numbers, because by March 28 they l thoroughly worked over the trunks of all the trees ept those in which the adults had matured and stly emerged.

Spot outbreaks of the beetle were found in other alities and in those places the work of woodpeckers the stems of infested trees was equally conspicuous, icating the destruction of a large percentage of the ods.

Subsequent examinations of infested trees in other alities in western North Carolina and eastern Tensce, particularly in the Smoky Mountains, revealed nditions somewhat similar to those just described.

Root Systems of Conifers Growing in Sphagnum

Prompted largely by the observation that windfalls are extremely rare in bogs, although they are common on both glacial till and muck soils in the same region, George B. Rigg and E. S. Harrar, of the University of Washington, made a study of the character and distribution of roots of coniferous trees growing in bogs having a surface layer of sphagnum peat. The field of study was four bogs, Ronald, Esperance, Schrieber Lake, and Evans Creek, all within a few miles of Seattle, Wash. The surface layer of these bogs is from 1 to 3 feet deep and is composed of dead sphagnum that has not disintegrated. In some portions there is living sphagnum at the surface. Immediately below the dead sphagnum there is either a layer of mud one foot or more in thickness or a much thicker layer of sedge peat. Where a layer of mud is present there is usually a layer of sedge peat beneath it. The total depth of organic matter in the bogs varies from 6 to 30 feet. The subjects of the study were the root systems of the six conifers western hemlock (*Tsuga heterophylla*), western white pine (*Pinus monticola*), lodgepole pine (*Pinus contorta*), western red cedar (*Thuja plicata*), Sitka spruce (*Picea sitchensis*), and Douglas fir (*Pseudotsuga taxifolia*). With the exception of Sitka spruce, which in the vicinity of Seattle is found only in bogs and swamps, control studies were made of the root systems of these species growing under normal conditions, mainly on glacial till.

Conclusions from the study were as follows:

The depth of tree root penetration in peat soils is controlled mainly by the height of the water table, though in some cases lack of oxygen, abundance of carbon dioxide, and high acidity may be factors.

The root systems of trees growing in sphagnum are far more spreading than those of the same species growing in firmer soils, and mat-like pedestals often develop.

Excessive root fusion often occurs in sphagnum peat.

Eccentricity of root growth and enlargement is characteristic of tree roots growing in sphagnum peat.

The combined effect of root fusion and elongation coupled with root eccentricity increases the mechanical efficiency of the anchorage of the trees growing in sphagnum peat, and these three phenomena are largely responsible for the lack of windfalls in the bogs of the north Pacific coast.

The eccentricity of root growth revealed in this study is discussed by the investigators as follows:

> Probably the most striking discovery made in this work is the strange shapes of the old roots. In cross section, young roots are circular or nearly so. On the other hand, the older ones are found to be very deep in proportion to their width. Though the eccentricity of growth was on both the top and the bottom of the root, there was much more growth on the bottom than on the top. The transverse sectional

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Beal, J. A.: Weather as a Factor in Southern Pine Beetle Control. rnal of Forestry 25: 742. 1927.

shapes of these roots conform to three general types, namely, the oval, the T-girder, and the I-beam. The I-beam or sometimes nearly rectangular structures were most abundantly found. An examination of tree roots of the same species growing in the firmer glacial till and muck soil depicted a striking contrast with those growing in the sphagnum peat. Although some of the older roots in glacial till and muck approached the rectangular shape near the base of the tree, the more nearly circular form was by far the most common type observed.

The increase in mechanical efficiency with the increase in the vertical axis of the transverse section as compared with the horizontal axis is apparent. It is known that the strength of beams of varying transverse sectional shapes varies approximately with the square of the vertical dimension when the horizontal dimension remains the same.

A rather special case of eccentric growth in roots in sphagnum was observed by the writers in the roots of the western red cedar (*Thuja plicata*). Where these roots have undulated in growth while young, excessive growth has later occurred on the concave side of each curve so that the root is much larger at the curves than in the comparatively straight portions between them. In a characteristic section of one of these thickened regions which was studied in detail, the eccentricity had begun as early as the third year of its life. On the side showing the greater growth, 28 annual rings were counted, constituting a total increment of 2¾ inches, while on the other side the total increment was only ⅜ inch and the rings were so merged that only 20 could be counted.

Eccentricities of growth in stems and roots have long been known. In 1803 Knight arranged apple saplings by a mechanical device so that the wind could sway them only in the arc of a circle, and found that at the end of a year the diameter of the stems in the direction in which they were most exercised by the wind exceeded that in the opposite direction in the proportion of 13 to 11. He also found that when a rigid support was placed around a young tree some distance above the soil so that the wind could sway the trunk above the support, the greatest growth in thickness occurred just above the support. He concluded that the greatest growth takes place where there is the greatest movement.

Ribes Found Growing on Rock Drifts on Shenandoah Forest

Blister rust control agents working on the Shenandoah National Forest, Va., in the spring of 1931 found round-leafed gooseberries (*Grossularia rotundifolia*, syn. *Ribes rotundifolium*) growing not only on bottom lands but on rock drifts well up the slopes, particularly on areas with northern exposure. The rocks were largely bare of vegetation, but were the abode of gooseberry plants in many cases 6 to 9 feet high. Gooseberry roots an inch or more in diameter were found, many of which could not readily be broken off or pulled out. In order to get the root crowns of the large bushes it was necessary to pry loose bowlders weighing sometimes from 50 to 100 pounds.

The areas where gooseberries were found growing on rock drifts are parts of the watersheds of Little River and Briery Branch.

A Classification of Some Wyoming S Profiles by Climate and Vegetation

Practically all the mature soils of the Big H Basin, in northern Wyoming, are fundamentally same from a scientific standpoint, but as one asce the surrounding foothills and mountains striking ferences in soils and in vegetation may readily be served, writes James Thorp, of the United Sta Bureau of Chemistry and Soils, who during the su mers of 1927–1929 worked on soil surveys of the a cultural lands of the Big Horn Basin. Mr. Tho observations, and tests of soil samples, point to following conclusions regarding the effects of vege tion and climate upon soil profiles in northern northwestern Wyoming:

> The presence or absence of lime in the soil, as terminable by ordinary field observations, depe upon the humidity of the soil as determined by rainfall combined with the average annual temperatu Where the rainfall is light, lime forms in the soil m rapidly than it can be leached out by percolating wat and it accumulates in a horizon which lies at the de of average moisture penetration. As the rain increases, the depth to this horizon of lime accumu tion increases until under a rainfall of approximat 20 inches it disappears altogether so far as can determined by simple tests with acid.
>
> Gypsum and salt accumulations disappear soo than the lime under the conditions mentioned in foregoing.
>
> The thickness of the heavy subsoil or upper B hori increases with the increase in rainfall, other thi being equal. This is the horizon of maximum illuv tion.
>
> The color of the soil is determined largely by proportion of grasses in the vegetation; the m grass, the darker the soil. Of course the quantity grass is largely dependent upon the rainfall in turn.
>
> Under like conditions of rainfall and parent mate a forest vegetation causes the formation of an al gether different soil from that formed under a prai vegetation.
>
> Topsoils in this region have a pH value of 6.5 more when the precipitation is less than 20 inches, a less than 7 when it is 20 inches or more. The values are lower in forested soils than in prairie so under the same rainfall conditions. In the pedoc (soils having horizons of lime accumulation) the is highest in the horizon of maximum lime accumu tion, whereas in the acid prairie and forest soil it highest in the C horizon.

On the basis of profile differences Mr. Thorp h grouped the soils of northern and northwestern Wy ming into six classes. Soils are pale gray-brown on t desert and become progressively darker as altitude a rainfall increase with the exception of group 6, whi is associated with heavy conifer forests. The first fo groups belong to the pedocals and are separated fro one another chiefly on the basis of the darkness of t color of the A horizons. Groups 5 and 6 are both humid zones. Although parent materials are frequent the same under both these groups, the profiles diff greatly owing to a great difference in vegetative cove Whereas group 6 has a heavy growth of conifers, gro as a heavy sod of grasses and flowers with no trees. cipitation, vegetation, and topsoil color in the groups defined are indicated in the following table:

l up	Topsoil color	Pre-cipitation	Vegetation
		Inches	
1	Pale gray-brown	5–10	Salt sage, sagebrush, rabbit brush, needle grass, grama grass, fleabane, pentstemon, pricklypear, paintbrush, shadscale
2	Light brown	10–15	Sagebrush, salt sage, grama and other grasses, lupine, larkspur, paintbrush, pentstemon, Mariposa lily, wild buckwheat, some juniper, loco, and gaillardia.
3	Chestnut brown	15–18	Same as above with no salt sage and with more sagebrush and a heavier sod.
4	Nearly black	18–20	More grasses and sagebrush than above.
5	Black or brown	20-40	Little sagebrush; heavy sod of grasses, lupine, pentstemon, paintbrush, gaillardia, harebell, forget-me-not, shootingstar, etc.
6	Ashy gray	20–40	Lodgepole pine, Douglas fir, Engelmann spruce, ground juniper, lupine, paint brush, harebell, gentian (moist spots), and others.

osion Research Station for Lake States

tudies of soil erosion under upper Mississippi Valley ditions and of methods for its control are to be con- ted on a farm of 160 acres 4 miles east of La Crosse, ., by the Lake States Forest Experiment Station the Wisconsin Agricultural Experiment Station, 1 cooperation from the Bureau of Chemistry and s and the Bureau of Agricultural Engineering. State of Wisconsin is furnishing the farm (funds the purchase of the farm were provided by the te emergency board), and the United States De- tment of Agriculture is providing the funds for rating the farm and conducting the research.

he farm selected is located at the top of a high e overlooking the city of La Crosse. About half is cultivated and about half is in woodland pasture. topography is such that all the water running off farm can be measured in five gullies which drain area, and that it is possible to lay out experimental s having many degrees of slope from virtually level ery steep.

t least two of the gullies draining the farm are vely cutting back into the soil. The emphasis of research will, however, be on means of preventing ion rather than on means of curing it. Engineering ctures such as soil terraces, and soil-management hods such as strip planting, will be tried out under ditions that will permit accurate measurement of r effectiveness in preventing erosion. Because ying is the chief agricultural enterprise of the on, it is planned to maintain a dairy herd on the a. The herd will serve a purpose in connection 1 the development of satisfactory methods of using steeper slopes for pasture. The roughest land will, ourse, be devoted to timber growing.

This fall a detailed topographical map of the farm is being made. Early next spring the engineering devices for erosion control and measurement will be installed and experimental plots will be laid out.

The southeastern portion of Minnesota and the southwestern and western portions of Wisconsin, particularly in the unglaciated region, are characterized by a rugged topography and by a soil especially susceptible to destructive gully erosion. Sheet erosion, also, is a serious problem on these areas and is causing considerable damage in other parts of Wisconsin. Erosion control represents one of the most urgent economic problems confronting farmers of this section.

Tree Planting at the Pennsylvania Masonic Homes

By E. F. Brouse, Pennsylvania Department of Forests and Waters

Among the most interesting tree plantings in Pennsylvania are those of the Masonic homes, located at Elizabethtown, which is about midway between Lancaster and Harrisburg. Here a property of 1,000 contiguous acres was purchased in 1910, upon which suitable buildings have been erected from time to time to house "dependent Free Masons in this jurisdiction, and the dependent wife, widow, mother, or minor children of such Free Mason." From the beginning an unusual interest was manifested in planting trees and landscaping the grounds. Expert advice was obtained and careful plans were made for the purpose of "improvement and decoration of the grounds." Late in 1910 the committee reported that "a system of forestation has been instituted so as to assure a uniform and harmonious development of the property into a State arboretum, by which the grand lodge will have therein a clump or grove of every kind of tree or shrub that is indigenous to the Commonwealth." The 1911 committee reported that "a complete planting plan for trees and shrubbery has been prepared."

By the end of 1912 a total of 56,300 trees and shrubs had been planted. The planting has been continued through all the succeeding years, and there have now been set out more than 100,000 plants which at a conservative estimate are today worth several hundred thousand dollars. There are now approximately 360 different species and varieties of woody plants on the grounds, representing almost all sections of the United States and a number of foreign countries including Japan, China, Africa, and Korea. Central Europe is especially well represented.

The grounds proper, aside from the tillable land, are a huge garden of trees. However, they do not appear overplanted; in fact, there are places for many additional trees. S. V. Reese, the landscape architect in charge, who has been at the homes since the start, states that originally the plantings included specimens of all the trees native to Pennsylvania. The representatives of some few species failed to grow, and those of a few others were destroyed through the erection of new buildings and through road construction. The number of different kinds is constantly being increased, although no special effort is being made at present to grow all the trees native to Pennsylvania.

Probably the most outstanding of the many interesting groups of trees planted about the grounds are several memorial groves. In 1918, 112 northern white pine trees were planted as a memorial to the past masters of the grand lodge of Pennsylvania, and since that time several have been added to this number. The trees were planted about 20 feet apart and are now 15 to 18 feet in height. An oak grove planted in memory of the Pennsylvania Masons who lost their lives in the World War consists of 268 oaks of eight different species, all native to Pennsylvania. These trees, from 15 to 30 feet in height, cover a small knoll about one-quarter mile from the main group of buildings. A beech grove consisting of 57 trees of nine species and a white birch group with 27 trees 25 to 30 feet in height present a striking appearance. Native dogwood has been intermixed with introduced species of varied color, with the result that striking effects are produced in the flowering season. What is probably the most pretentious group, planted about Grand Lodge Hall, contains more than 2,100 woody plants of 102 different kinds.

For the most part the plantings are informal. Most of the trees are now 15 to 20 years old and are of such size that individually, as well as in groups, they are truly beautiful.

Tree planting has not been confined to the campus. Trees were set out on unproductive areas about the farms, and a portion of the woodland was restocked. Approximately 90,000 seedlings and transplants of 26 species have been planted for timber purposes. Of this number about 80 per cent were northern white pine, Norway pine, and Norway spruce. Some of the white pine and Norway spruce planted in 1910 now are 30 to 35 feet in height and are making excellent growth. Norway pines set out in 1918 average from 12 to 15 feet in height and most of the other species are growing reasonably well. In earlier years the white pine was attacked by the weevil, and some little difficulty has been experienced with several other insects. The trees have been comparatively free from disease. The plantations have suffered somewhat by the removal of trees to be planted singly or in smaller groups about the grounds for ornamental purposes.

A prostrate juniper growing naturally near the grounds is estimated to be more than 160 years old. It has a spread of 45 feet and averages only 3 feet in height. A large number of cuttings have been taken from this tree and planted at the homes, with the result that more than 100 thrifty specimens from 2 to 8 feet in spread are growing about the grounds. The largest has a spread of 15 feet and is approximately 2½ to 3 feet in height.

The landscape department of the homes operate tree and shrub nursery covering an area of about acres. According to a recent inventory, the nurs contains 80,000 plants of 230 varieties, from 3 inches 8 feet in height. Surplus nursery material is oft available and is sold at a low price, usually to memb of the fraternity. The receipts range from $200 $5,000 a year. In 1930 they amounted to $2,6 This revenue, in addition to a yearly sum of appro mately $640 made available through an endowme portends the perpetuation of the plantings.

International Association of Wood Anatomists Adopts Constitution

The constitution of the International Association Wood Anatomists was adopted at Paris in July, 193 during the Congrès International du Bois et de la Syl culture, at a meeting attended by 25 persons represen ing Belgium, France, Germany, Great Britain, Hollan the Philippine Islands, and Spain. Pending the ele tion of a council executive powers were placed in t hands of the organizing committee, of which Samuel Record, professor of forest products in Yale Universit is secretary. Persons actively engaged in the study wood anatomy are admissible as ordinary member and provision is made for admitting as corpora members institutions or other corporate bodies inte ested in wood anatomy.

The object of the association is "to advance th knowledge of wood anatomy in all its aspects." A tivities which the body undertakes are "to interchan ideas and information through correspondence an meetings; to facilitate the collection and exchange material; to work toward standard terminology an descriptions; to stimulate the publication of scientif articles and abstracts; and to encourage and assist th study and teaching of wood anatomy." Person interested in the activities of the association are invite to correspond with Professor Record.

* * *

Correction: The recent decision of the Federal Trad Commission, reported on page 18 of the September 1931, Forest Worker, permitting the use of the ter "Philippine mahogany" as a trade name for the wood which have commonly been known by this name, speci fies that the term "mahogany" must not be employe in the sale of these woods without the modifying term "Philippine."

* * *

Visitors to the national parks in the year ending September 30, 1931, numbered 3,152,845, or 14 per cent more than in any previous year. Yosemite Park alone had 461,855 visitors.

Foreign Notes

uirrel Damage to Forests in Great Britain

stracted from article by A. D. MIDDLETON, University Museum, Oxford, in the Quarterly Journal of Forestry, October, 1931)

The spread of the American gray squirrel in Great tain in recent years has been noted by British forest- with consternation. Before the end of the last tury the British forester had only one species of irrel to contend with in his efforts to raise straight l sound timber. That species, the red squirrel, has fered a great reduction in numbers during the past years, mainly as a result of disease, so that in most ts of the country its depredations have become nost negligible; but every estate in the north of tland where large areas are occupied by pure stands Scotch pine has suffered enormous losses from ling by squirrels since the beginning of the present tury. On the Novar estates in Ross-shire, Viscount var estimates that in 1900 the damage to Scotch e plantations by squirrels amounted to £10,000 l that the value of the Scotch pine timber now nding is reduced by £10 per acre owing to the ling carried on when the trees were young. Squirrel nage to Scotch pine is by no means unknown in gland, and the creation of large planted forests of ifers throughout the country is likely to produce al conditions very similar to those of north Scotland. e factor most affecting the extent of the damage is doubtedly the nonavailability of other foods for squirrels in early summer.

From mid May until the end of July, when the sap ctively moving, the red squirrels peel the bark from young Scotch pines and eat the succulent inner k or cambium layers. This peeling is generally ited to wood of from 4 to 8 years' growth, on trees to 25 years of age, and the main stem is usually the t most attacked. On the average Scotch pine of to 20 years the point of attack is generally between nd 8 feet from the top. The main stem is either npletely girdled or peeled in patches of various sizes. here the squirrel peels at all he peels an area of eral square inches, and in many cases a length of r 3 feet on the main stem is practically stripped of ry vestige of bark.

When a tree is completely girdled the top either dies d decays or is broken off by the wind. This often ults in the death of the whole tree; in most cases, wever, a lateral from a point below the peeled area es the lead or two or three laterals make equal wth, with the result that the tree can never form a aight bole of any timber value. When the cambium stripped from considerable areas but not so that the trunk is girdled, the tree may be able to continue growth, though often in a weakened condition. Callus is formed around the edges of the wounds, but it is impossible for new wood to form and the proper increase in girth to take place on the peeled area. In the course of years the outward growth of the sound cambium around the edge of the wound causes the callus to close over the depression and the expansion of the surrounding areas completely covers it, the bark sometimes becoming whole and continuing growth. When the timber is cut, probably 80 or 100 years after the peeling, the tree may outwardly appear to be sound but because of a deep-seated fissure edged with callus at the site of the damage many of the largest planks sawn from the bole are faulty. The growth of fungus spores also is facilitated by patch peeling. Indiscriminate ringing and peeling by a large squirrel population often damages more than half the trees in a plantation; consequently it is almost impossible to obtain a full stand of sound mature pines where squirrels are very numerous.

The British red squirrel (*Sciurus leucorous*) is primarily a resident of coniferous forests, and its feeding habits appear to be especially adapted to the conditions of a pine forest. Scotch pine is the only species grown in Great Britain that is especially subject to peeling by red squirrels; in a few localities, however, notably in the south of England, both European and Japanese larch have been similarly peeled when squirrels were very numerous. Because there is no British squirrel especially adapted to life in hardwoods the red squirrel has to a certain extent modified its feeding habits (especially in England) to occupy both coniferous and deciduous woodlands.

The gray squirrel (*Sciurus carolinensis*) has a much wider food range than the red, being especially prone to eat fruit and garden produce. In destroying buds and shoots of trees and in eating seed it differs little from the red, and it likewise carries out extensive peeling on young trees and the young wood of older trees; but all the records of its depredations of this sort refer to hardwoods, never conifers. The species most subject to peeling by gray squirrels is sycamore, with beech as a good second. Young trees of these species have been damaged extensively by the gray squirrel in many parts of Great Britain. The method is very similar to that of the red squirrel, the bark and cambium being peeled from large patches often with the result that the tree is girdled. The worst peeling is on 4 to 10 year old wood, and generally on trees of 10 to 20 years' standing, although in some cases the gray squirrel has been observed to peel the bark from branches of mature beeches. Other hardwoods peeled in the same way are oak, ash, maple, walnut, horse chestnut, birch, and lime.

Squirrels have no predatory enemies of any significance in Great Britain, and methods for biological control or poisoning of squirrels have not been completely investigated. Shooting is the favored control method, with trapping as an alternative.

The Beech Woods of the Balkan Peninsula [4]

By N. STOYANOFF, Institute of Agricultural Botany, Sofia

Beech woods are widely spread in the mountains of the whole Balkan Peninsula, with the exception of the southernmost parts. The southern limit of the genus Fagus is on Mount Oxya in Greece. The woods are most characteristically developed in the central districts of the peninsula and the largest is that covering the slopes of the Balkan range for a length of about 250 kilometers.

Two species occur, *Fagus silvatica* L. and *F. orientalis* Lipsky, and each requires a certain degree of humidity of the air. The former is consequently found in the damp altitudinal zone of the mountains, and the latter, which requires a higher temperature, in damp valleys at lower altitudes. Under more humid climatic conditions, as for example on Mount Strandza in eastern Bulgaria, *Fagus orientalis* also occurs in open places.

In the northwestern parts of the Balkan Peninsula *F. silvatica* shows practically no altitudinal lower limits, and this is true also of *F. orientalis* in the east. Over the greater part of the peninsula, however, the common beech has a definite lower limit of distribution varying from 300 meters to 1,100 meters, being higher in the south than in the north and on southern slopes of mountains than on northern.

The natural upper limit lies between 1,700 meters and 2,000 meters. It is, however, often lowered in consequence of unfavorable ecological conditions or of an intense development of coniferous woods.

Beech woods usually prefer the northern slopes to the southern, and this preference is more marked towards the southern limit of distribution.

The beech is generally indifferent to the chemical nature of the soil, though in Istria and Albania it shows some preference for calcareous soils and in the continental eastern regions, as in Bulgaria and east Macedonia, it evidently prefers siliceous soils. The edaphic conditions are thus complementary to the climatic. In all parts of the peninsula the beech avoids very moist soils. Well developed woods are usually to be observed on slopes not steeper than 50°.

Beech trees are taller in the west than in the east of Bulgaria. Thus the mean height of the oldest beech trees growing on the western parts of the Balkan chain is 37 meters, on its central part 34 meters, and on its eastern part 23 meters. On the Rila Mountains and
also in eastern Serbia beech trees are recorded w
are 40 meters or more in height.

Fagus silvatica usually shows a considerable po
of rejuvenation both by seeds and by shoots.
orientalis, on the contrary, regenerates but slowly
shows a tendency to be replaced by oaks.

About 40 species of trees and shrubs occur in the
garian and Illyrian beech woods. At the upper
of the beech belt the beech woods usually merge i
coniferous communities. A narrow zone of mi
forest, with *Betula alba* predominating, may someti
be observed between the beech belt and that of
conifers. At their lower altitudinal limits the be
woods merge into oak woods, mixed broad-lea
woods, woods of Castanea, or woods of *Pinus nigr*

More than 300 herbaceous species are conside
typical for the Bulgarian beech woods and about
are quoted by Beck for the beech woods of the Illyr
countries.

The composition of the Bulgarian beech woods sh
a considerable resemblance to that of woods growing
countries so far distant as Sweden and England. T
resemblance can be explained by the common history
the constituent elements. From this standpoint
beech wood can be regarded as a vegetational unit,
which most of the characteristic species have had
ancient origin and a similar distributional history.

The beech belt in the Bulgarian mountains a
probably also in those of Macedonia shows a tende
to extend upwards, thus replacing coniferous woo
It is possible that the post-Diluvial (post-Glaci
changes in the vegetation are not yet completed in th
countries.

The beech forests of the peninsula are relatively l
destroyed by the activities of man than other kinds
woods such as those of oaks and conifers.

Fagus silvatica and *F. orientalis* when growi
together in eastern Bulgaria are connected taxono
cally by intermediate forms. These are observed in
localities where the species meet. In the eastern p
of the Balkan chain whole forests are formed by su
intermediate types.

Spruce too Small for Pulpwood Mak Fenders for Welland Canal

Long, straight, slender poles of black spruce abo
4 or 5 inches in diameter at the butt and between
and 40 feet in length, neatly cut and peeled, are bei
used to make fenders for the Welland Canal. This n
use for spruce below pulpwood size is discussed by
Newton-White in the Illustrated Canadian Forest a
Outdoors as follows:

> These poles were cut from trees that many of
> have cut down by the acre and the hundred thousan
> in land-clearing work. Trees that in the bush we ha
> cut only for skids, or perhaps to make the pole roof
> a cabin.
> * * * A fender "pole" is composite. * *
> A form is built into which the little long poles a

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[4] Paper read at the Fifth International Botanical Congress, Cambridge, England, August, 1930.

ked to form a long cable or boom, 3½ feet in
neter.

hree to four hundred feet long are these fender
es. The individual pieces which go to their making
carefully placed for a snug fit, and well spiked to-
her. Three or four steel cables are incorporated
gitudinally as reinforcement. At intervals the
le" is bound by cables round its girth And to the
king of one fender pole goes some 2,300 pounds of
le and 27 kegs of spikes.

t certain places on the canal the fenders are placed
loat attached to a row of deep-driven piles. Placed
he feet of the towers of the railway and highway
lges which cross the canal in its 25-mile length,
r purpose is shock absorbing. The avoidance of
to a tall structure which, as in the case of a "ver-
l lift" bridge, is designed to hoist up a 200-foot
n a clear 120 feet above the water level, must be of
small importance. These fender poles, from the
terial and nature of their construction, have "give,"
vell as great strength. The piles to which they are
ached have "give" also. Placed out a little distance
n the vital spots to be protected, the combination
es up the force of a glancing contact with the momen-
n of a big ship.

But to return to our little black spruce trees. The
n who cut and peeled them were quite pleased with
work, its unfamiliarity notwithstanding. * * *
awknifing is, perhaps, something of a refinement in
h work. The pay was by the foot, with a bonus
en on certain conditions. In reasonable weather,
en the bark and sapwood was not too hard frozen,
l there was a fair bush to work in, a man could cut
l shave 15 or 20 poles in a day. He cut down his
ected trees, trimmed them up neatly, and pulled,
ried, or slid them out to where he had some improvised
angement which held them up in good position for
nipulation of the drawknife.

Some idea of the nature of this black spruce can be
hered from the specifications of the contract. The
es had to average 35 feet, with nothing below 30
t accepted. The maximum butt diameter had to
5 inches and the minimum 3¼ inches. The tops
asured at 1 inch. * * *

As a matter of fact, some of the individual poles cut
this purpose showed a length of full 40 feet, yet with less than a 4-inch butt, and were straight as gun barrels at that. Straightness was a prime requirement. * * * Handled without care in the severe frost—20° and 30° below zero—when green timber may be expected to be as brittle as china, these lissom rods refused to break. The teamsters loading them onto the sleighs in the bush disentangled them from the piles, where their ends ran down under deep snow and rubbish, with heaves that bent them like whips; but they did not crack. The men threw them onto the loads, or onto the pile at the siding, or onto the flat car at the loading, with handling that would have jarred a frozen hardwood pole into fragments; but it did not hurt these. * * * These trees, for all their slimness and general appearance of youth, are just as old as the bigger trees among which they grow. Well over 100 years in many instances. They are the trees of the forest stand which, in the early competitive struggle among themselves for existence, managed to attain a place in the sunlight, but no more. They were never overtopped, but surrounding trees managed to grab up the best soil space and so these grew lean from meager nourishment. But they grew tough, as lean people often are.

And yet, in spite of their qualities and the time which has gone to the making of this unique timber * * * they have always been a waste product of the northern bush. These trees are left standing after the closest pulpwood operation that was ever conducted, because even their butts barely come within pulpwood specifications. As firewood they have no appeal because of the small size.

Left standing after timbering operations, these trees do not survive one in a hundred. With the protection of their fellows removed they speedily wilt to the pitiless light beating in on them from tip to root. The storms lash them about and they uproot; or the snow and ice settles on them with an insupportable load, and they take a permanent bend. They lose vitality, whereupon insects and fungi get in their work. More likely than anything the slash fire gets them.

So here is a sometime despised and neglected material which is yet capable, at the inventive command of some engineer, to serve a humble but very useful part in the operation of the great Canadian ship canal.

Personals

Samuel Newton Spring, professor of silviculture at
rnell University, has accepted appointment as
sistant dean of the New York State College of Fores-
, at Syracuse University. This position, newly
eated, carries responsibility for coordinating educa-
n and research at the college and for directing in-
uction both at the college and at the New York
te Ranger School. Professor Spring will assume
new duties early in 1932. Before joining the Cor-
ll forestry faculty in 1912 Professor Spring, who is
alumnus of the Yale School of Forestry, had experi-
ce in the United States Forest Service and as State
rester of Connecticut.

Lorne W. Barclay, formerly with the Oregon Trail
emorial Association, has been appointed to the newly
eated position of director of the National Parks
sociation.

M. W. Talbot, who has had charge of weed investigations in the Division of Botany, Bureau of Plant Industry, since 1923, and who before that was engaged in range research in the Southwest as a member of the United States Forest Service, has been transferred to the California Forest Experiment Station, where he will have charge of range management studies. Mr. Talbot is the author of a number of publications on range management.

W. R. Stevens has been placed in charge of the forest fire weather work of the United States Weather Bureau, with headquarters in Washington, D. C. The bureau now has forest fire weather work in progress in California, Washington, Oregon, Idaho, the Lake States, and the Northeast. Heretofore Mr. Stevens assisted in the forecast division of the Washington, D. C., office of the bureau.

Members of the Minnesota Conservation Commission recently appointed by the governor under provisions of a new law reorganizing the commission are William E. McEwen, Duluth; James T. Williams, Minneapolis; John R. Foley (secretary), Wabasha; Richard R. Bailey, Virginia; and Ernest T. Reiff, North St. Paul.

T. J. Starker, professor of forestry in the Oregon State Agricultural College, is spending his sabbatic year at the Pennsylvania State College as visiting professor of silviculture. He is substituting for H. J. Lutz, who is enrolled in the Yale School of Forestry as a candidate for the doctor's degree.

Guy R. Stewart has been appointed senior forest ecologist at the Northeastern Forest Experiment Station, in charge of planting studies. Doctor Stewart was formerly in charge of plant nutrition work in the University of California, and has had experience in that field in Hawaii. He received the Ph. D. degree this year from Cornell University.

Dwight B. Demeritt, who has been connected with the forestry department of the Pennsylvania State College for the past few years, is now associate professor of forestry at the Iowa State College. He succeeds D. S. Jeffers and has charge of the work in mensuration, management, administration, and protection. Professor Demeritt holds forestry degrees conferred by the University of Maine and Yale University. In addition to experience in teaching at the University of Maine and the Pennsylvania State College he has had two years' experience in forestry extension in Louisiana.

B. A. Krukoff, a graduate of the New York State College of Forestry, who within the past few years has done field work in forestry in tropical Africa, Brazil, and Sumatra, has recently returned to Brazil for several months' field work. In connection with certain commercial investigations which he has been authorized to make, he plans to prepare a comprehensive series of botanical specimens in cooperation with the New York Botanical Garden. This material will be studied and identified by members of the staff of the New York Botanical Garden in cooperation with specialists in the United States and in Europe. Extensive series of duplicates that Mr. Krukoff plans to prepare will later be distributed by him to institutions interested in obtaining such material.

Allen W. Goodspeed, for the past two years forester for the Litchfield Forestry Association, Litchfield County, Conn., has been made instructor in applied forestry in the Yale School of Forestry, from which he was graduated with the M. F. degree in 1929. Mr. Goodspeed received the B. S. degree in forestry from the University of Maine in 1928. He will work with Professor Hawley, devoting most of his time to the operations on the Eli Whitney Forest.

F. G. Renner has been transferred from the In
mountain Forest and Range Experiment Stat
Ogden, Utah, to the California Forest Experim
Station, at Berkeley, Calif., where he will take par
range investigations. G. W. Craddock, of the in
mountain station, has been assigned to the B
erosion project as Mr. Renner's successor.

J. D. Sinclair, who has had charge of erosion stu
of the Southern Forest Experiment Station, is be
transferred to the California Forest Experiment S
tion to work on erosion studies directed by W.
Lowdermilk.

S. B. Locke, who has had charge of forest and ra
biological investigations of the Intermountain For
and Range Experiment Station, has resigned to acc
a position with the Izaak Walton League.

S. V. Fullaway, jr., formerly secretary-manager
the Western Pine Manufacturers Association, is n
secretary of the newly formed Western Pine Assoc
tion, of which David T. Mason is manager. M
Fullaway resigned from the United States Forest Se
ice in 1927 as chief of the branch of forest products
the Missoula, Mont., regional office.

Robert A. Zeller, since 1922 supervisor of the Tong
National Forest, Alaska, has been transferred to t
supervisorship of the Superior National Forest, Mi
Mr. Zeller is a native of Pennsylvania and a gradu
of the Pennsylvania State Forest School. When
entered the Forest Service in 1917 his first assignme
was as a ranger on the Superior Forest.

Charles Whitfield has been appointed associate for
ecologist at the Southwestern Forest and Range Expe
ment Station, Tucson, Ariz. Mr. Whitfield has for
number of years assisted F. E. Clements, of the C
negie Institution, in his ecological work at San
Barbara, Calif., and is working for a doctor's deg
from the University of Chicago. In his new positi
he will assist C. K. Cooperrider in range manageme
research.

Aubrey H. MacAndrews, of the department of for
entomology, New York State College of Forestry, h
been promoted to an assistant professorship and is n
in charge of the department.

J. Lee Deen, who received the M. F. and Ph.
degrees from Yale University in 1929 and 1931, respe
tively, is now an instructor in silviculture in the Ya
School of Forestry. Mr. Deen received the B. S. degr
in forestry from the University of Minnesota in 192

K. S. Trowbridge is now county forester for Libert
and McIntosh Counties, in south Georgia, a territo
including much forest land naturally well adapted
slash pine. His headquarters are at Darien. M
Trowbridge was formerly one of two State extensio
foresters in Georgia.

Bibliography

ody Plants of the Northern Rockies

By W. A. Dayton, United States Forest Service

ree books are fairly common but a treatise covering n trees and shrubs is, indeed, a "rara avis in terris, oque simillima cygno." Such a rarity is the post- ous book[5] of the late Joseph Edward Kirkwood, se untimely and lamentable passing in August, 8, was a shock to his numerous friends and to others iliar with his work or interested in the flora of the stern States. This octavo volume, with good paper excellent typography (the Latin names in bold-), handsomely bound in green buckram, consists 340 printed pages, 35 photographic plates, and 87 figures, most of which are from Professor Kirk- d's own versatile pen.

his very useful and attractive book begins with a graphical sketch of the author by Morton J. Elrod, fessor of biology in the University of Montana, fol- ed by the author's preface. An introductory chapter 1 pages deals with such features as the philosophy otanical studies, the topography, climate, and geo- ical history of the region as correlated with its flora, the relations of its flora to those of contiguous ions, and includes also a statistical summary, by ilies, of the plants discussed. The body of the book sists of notes, by families, genera, and species, with s to genera and species. The treatment covers 27 ilies, 79 genera, and 248 species. While chief em- sis is placed on the systematic and distributional ses, considerable attention is paid to such subjects history of the species, phenology, pollination, repro- ction, associates, and tolerance. Economic notes, ile not so general or full as might perhaps be desired, not wanting, especially in the family and generic scriptions. The publication concludes with a 12-page strated appendix on botanical terminology and arate indices of common and scientific names.

The nomenclature follows the American Code. It is sonably conservative, and, with few exceptions, con- tent. There may perhaps be a justifiable question, example, as to whether the acceptance of Atragene d Bossekia as valid genera is consistent with the ppression of Azaleastrum, Dasiphora, and Leptodac- lon; but, of course, these are matters on which it is possible to obtain universal agreement. It is re- ettable that the author uses Holodiscus instead of the ich older Sericotheca. The *Odostemon aquifolium* scussed on page 127 appears to be *O. repens*. On ge 165 the author states that Bossekia differs from ubus "in having simple leaves, smooth stems, and a w other marks." This is somewhat confusing because such simple-leaved, nonprickly-stemmed species as *R. chamæmorus* and *R. odoratus*, from Linnaeus down, have been universally defined as of the genus Rubus.

A valuable and useful feature of this publication is the accentuation of scientific plant names, which, in general, seems to have been accurately done. Pentstemon, however, should be accentuated on the penult rather than on the first syllable, the second "e" being long. The author uses the acute accent for short vowels and the grave accent for long or broad vowels. There is a little inconsistency in the use of these accents; for example, the acute accent is used on the "i" of the trivial name in *Symphoricarpos oreophilus*, whereas the grave accent is similarly used in *Vaccinium oreophilum*.

In the Rhamnus key (p. 224) *R. alnifolia* and *R. purshiana* are separated solely on the basis of the former being a "low shrub" and the latter a "small tree," which seems unfortunate in view of the radical differences between the two species in inflorescence, leaf venation, etc., and in view of the inevitable occurrences of luxuriant alnifolia and depauperate purshiana. In the key to Ericaceæ (p. 248) the genus Rhododendron is confined to the group with evergreen leaves; yet in the description of the genus (p. 257) the leaves are described as "evergreen or deciduous," and *R. albiflorum* (pp. 258–259), which the author regards as a true rhododendron, has, of course, deciduous leaves.

To those who, like myself, are interested in and value vernacular names the free use by Doctor Kirkwood of English plant names is most pleasing. Writers in the United States Department of Agriculture are subject to restrictions in having their English plant names harmonious and consistent, since they can not follow Standardized Plant Names rules in names, not already in that work, that appear in diverse form in the Style Manual of the Government Printing Office or in Webster's Dictionary. Free as he presumably was of such restrictions, it seems regrettable that Doctor Kirkwood did not write his English plant names in altogether consistent fashion, preferably in accordance with the simple, reasonable, and logical rules of Standardized Plant Names. For example, it is logical and in better form to write mockorange and pricklypear solid and to hyphenate hop-sage, mountain-ash, and Oregon-grape rather than to write such names as two words, since those plants are not true oranges, pears, sages, ashes, and grapes, respectively. Moreover such names as buffaloberry and twinflower are preferably written solid rather than as two words, since they connote a unified idea (generic concept), just as a Latin generic name is never written other than as one word (though occasionally hyphenated). In writing English plant names the hyphen, of course, should be used only as a last resort, and the apostrophe probably

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Kirkwood, J. E.: Northern Rocky Mountain Trees and Shrubs. pp. Stanford University, 1930.

can always be eliminated. The plant names feltleaf, heartleaf, and greenback willow and redberry elder are preferable to the forms felt-leaved, heart-leaved, greenbacked, and red-berried. "Wood's rose" (which is obviously incorrect) should become Woods rose, "Fendler's rose" is better rendered Fendler rose, and so on. "Sessile-leaved willow," for Salix sessilifolia, is entirely too bookish a name ever to find general acceptance; personally I prefer such a name as velvet willow.

A sidelight on Doctor Kirkwood as a man and a botanist, which needs no comment, is seen in the absence of his name as authority for any plant mentioned in this volume.

Plant lovers, botanists, and foresters are sadly susceptible, as a class, to the argumentum ad crumenam; the usefulness of this volume is, therefore, handicapped by its cost, $7.50.

Dengler's Waldbau

By C. F. Evans, United States Forest Service

In his 594-page volume Waldbau auf Oekologischer Grundlage[6] (Silviculture on an Ecological Basis) Alfred Dengler, professor of forestry in the Eberswalde Forest School, devotes 266 pages to the subject of forest ecology before he takes up the subject of silviculture. He states the reason for this in the foreword as follows: "Only a complete mastery of the ecological bases makes possible a correct understanding of the complicated relationships in the life of the forest and therewith also a scientific foundation for all silvicultural measures." The average American reader will probably wish that even more space had been reserved for ecology at the expense of silviculture. The principles of ecology are universal in their application, while the technique of silviculture must be localized. Dengler says "All silviculture is local, indeed often conditioned by the smallest area. But these variations are by no means without order. They all can be traced back finally to the same universal and orderly relationships that exist between the exceedingly varying site on the one hand and the species and management on the other."

An outstanding characteristic of the book, and one that adds greatly to its value to the student, is the manner in which the author manages to present a balanced treatment of disputed questions, drawing freely from the work of others and stating his own views with modest brevity. To assist the reader in further study a most comprehensive bibliography is provided.

The following condensed outline will give a general idea of the contents of the book:

Part I. *Ecology of the forest as a basis of silviculture.*

Section 1: The forest as a type of vegetation. Eight chapters of description of forest zones of the world. History of the changes in forest composition in Germany.

Section 2: The influence of life factors on the i vidual species. Seven chapters covering the follov factors: (*a*) Heat, (*b*) water, (*c*) light, (*d*) carbonic a (*e*) wind, (*f*) soil, and (*g*) inherited tendencies.

Section 3: The life processes and the course of lif the forest. Six chapters as follows: (*a*) Blooming fruiting, (*b*) reproduction and distribution, (*c*) germ tion, taking root, and establishment, (*d*) furt development in early youth, (*e*) development in pole and tree ages, and (*f*) age, sickness, and death.

Part II. *The technique of silviculture.*—

Section 1: The kinds or types of stands. Six ch ters of description of the different forest types in (many, with a detailed discussion of the use of ex species.

Section 2: The establishment or reproduction stands. Nine chapters dealing with reforestation afforestation, both by natural and by artificial means

Section 3: Culture and care of the stand. T chapters on release cuttings, thinnings, pruning, cu vating, and other measures.

Section 4: The economic or management forms the forest. Three chapters on silvicultural treatm or cutting methods.

Of special interest and value to American forester the very full treatment of the following subjects:

1. The interrelationships of forest and soil and effect on the soil of such practices as clear cutti removal of litter, grazing, etc.

2. The use of exotics. German experience w exotic species has not been altogether happy. In ma cases exotics that showed early promise have la failed to do well. Exotic species and even spec indigenous to Germany are found to have clima varieties. It is to be hoped that American forest will profit by German experience and not try to est lish species in regions that are climatically unfavoral to them. This matter calls for consideration in t case of northern white pine and Norway pine, f example. At present many planters in the easte United States are using seed of these species witho giving proper attention to its source.

3. Adaptation of species to environment and t effects of radical changes in environmental facto e. g., sun scald produced by sudden release.

This book probably contains comparatively litt that is new or that represents original work by t author. It is rather to be regarded as a comprehensi compilation of existing information. The Americ student of forestry will find it well worth reading.

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A paper by Donald Bruce and L. H. Reineke, Preparation of Volume Tables by an Alinement Cha Method, has been mimeographed by the United Stat Forest Service, in order that the information it co tains may be made available to those interested earli than the paper can be gotten out in printed forn Requests for copies should be addressed to the Unite States Forest Service, Washington, D. C.

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[6] Julius Springer Press, Berlin.

Seeding and Planting

By E. E. Carter, United States Forest Service

Clarence F. Korstian has made a needed revision of fessor Toumey's 15-year-old textbook, Seeding and nting in the Practice of Forestry.[7] The result should to restore the book to at least its former eminence he classroom and in the reference library. Doctor rstian, in his preface, takes the responsibility for changes.

Probably the strongest impression the volume es is that of care taken to search the literature on subject. Occasionally there is a statement of some eriment made or practice developed by Professor umey himself, but in large part the book seems to a compilation of much that is new and some that ld in nursery and planting literature, with care taken give credit to the source. The task of selecting the t has been well done, in general; but some authors y be unpleasantly surprised to find themselves cited authorities for statements made many years ago, ore the test of time had been fully applied to their as or inventions. Also, the practitioner will wonder y the authors have not brought out more sharply relative value of new proven processes as compared h the old, instead of leaving the student to make his own mind from the facts and descriptions given. case in point is the use of the Olson tree bale for pping nursery stock instead of the crate or box. netimes a statement, true enough in itself, loses ce for American foresters because of the origin or hority cited. "Recent investigations in Europe arly prove that variations in the characteristics of mother tree due to soil and climate may be transtted through the seed." Certainly this has been ved also by American foresters working with Ameri- trees such as Douglas fir from high and from low itudes in the Pacific Northwest.

The book deals in generous measure with the fundantals of artificial reforestation without attempting cover fully the application of those underlying truths the particular conditions which may confront the nter. It is not a manual. Technique is described ly and well, but the art of management is hardly ched except in three short paragraphs at the end der "Field organization for planting." The growing the species or crop needed for a particular market is rely mentioned, but much emphasis, apparently recting the European authorities studied, is laid on eventing soil deterioration. Costs, when mentioned, usually given in relative terms, although Korstian ates that time figures are given so that any desired ge scale can be applied.

Most experienced foresters will approve the way in ich the chimera of exotics is treated. "The extene use of Scotch pine, Norway spruce, and other ropean species in restocking forest lands in the eastern ited States is, in the authors' opinion, to be regretted. So also the use of eastern hardwoods on the Pacific coast. In none of these regions has any of these species been brought to maturity in forest stands, and the results from such restocking are largely problematical. Often the chief inducements are rapid juvenile growth and low cost of seed and nursery stock." The use of eucalyptus in California is cited as an example of the forest planting of exotics which "have proved of value." Is this irony? If so, it comes as a surprise from Professor Toumey.

Much of the information in this book should be part of the background with which the practicing forester approaches a planting job. For a student seeking to acquire such a background, this text will be of great service. The revision retains the clarity of expression and the forceful statement of demonstrated fact which have characterized Professor Toumey's lectures and writings. Those to whom these dicta seem self-evident should think of their student days. Blessed are those who point out the right road in a strange land. Further, the only practicing forester who will not benefit from reviewing fundamentals is the one who already knows it all; and he, if he exists, will not be practicing long.

One feature unusual for a textbook is the absence of cross-references. Even "as discussed elsewhere" is not used. Such confidence of ability to say all and only the things that need to be said in any one place is begotten only by mastery of the subject. That is one reason for this book's high standing.

Many of the illustrations have appeared, in more or less smudged form, in Forest Service publications. Owing possibly to better paper, possibly to better reproductive processes, in this book they are distinctly more clear. Also, the original photographs have not been cut so closely. The result is that the pictures tell their story better.

Management of Spruce Lands in the Northeast

By K. W. Woodward, University of New Hampshire

As soon as the Northeastern Forest Experiment Station was established it became apparent that one of the most urgent problems to be tackled was the question, How can satisfactory second growth be obtained in the mixed stands of northern hardwoods and conifers? The Forest Service itself wanted to know in order to handle its timber sales on the White Mountain National Forest, the pulp companies were crying for the information, and the failure of the ordinary methods of culling was glaringly apparent.

On this problem Marinus Westveld has been working steadily since 1925. He has examined 420 temporary sample plots varying in size from 0.1 acre to a full acre and has established on the White Mountain National Forest permanent plots upon which he is testing his inferences.

Naturally softwoods are the most desirable species in the Northeast. The problem is, in brief, one of

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J. Wiley & Sons (Inc.), New York.

insuring a sufficient supply of spruce and giving it a fighting chance against its competitors. Fortunately spruce reproduces well even under mature trees, so that there is a good supply of advance growth on the ground when cutting takes place. The spruce can not come through in competition with the hardwoods, however, without cleanings. In general Westveld's answer, as set forth in his two bulletins [8] entitled "Suggestions for the Management of Spruce Lands in the Northeast" and "Reproduction on Pulpwood Lands in the Northeast," is: Cut the mature trees clean if the market permits. Otherwise select the bigger trees for cutting. Avoid injury to the advance growth. Come back within 10 years and either cut back or girdle the competing hardwoods.

The percentage of balsam will be greater in the cut-over stands than in the old-growth stands, because balsam reproduces more abundantly than spruce; but you can still have a decent percentage of spruce if you will follow directions.

The result of this study shows that the way to get an answer to a forest problem is to pick a good man and give him time and means to get the facts and work out reasonable hypotheses to explain these facts.

Important Western Browse Plants

By ARTHUR W. SAMPSON, University of California

"Important Western Browse Plants" is a well-selected title for a bulletin [9] by W. A. Dayton that has recently been published by the Department of Agriculture; there are indeed many important browse plants. Foresters, landowners, and others have real need for authoritative information concerning the food value of browse vegetation for herbivora and concerning methods of maintaining browse cover, particularly on important watersheds. The author, a taxonomic botanist and forest ecologist, is peculiarly well qualified to bring such information together in usable form. Mr. Dayton and his Forest Service co-workers have had this stupendous work in progress over a period of more than 20 years.

The primary meaning of "browse" is shoots or sprouts, especially "of twigs and stems of woody plants, with their leaves, as cropped (browsed) more or less by domestic and wild animals." Browse is also a generic term applied to shrubs, woody vines, or small trees, whether eaten by livestock or not. Accordingly the number of browse species in the United States is in the thousands. On the national forests alone 1,000 or more species have already been collected, representing 225 genera and 68 families.

Browse vegetation is distributed from sea level to timber line, being most abundant at intermediate elevations where arborescent species grow sparsely. often occurs in desert regions so abundantly as to character to the landscape, being enabled to withs drought through special leaf adaptations, through foliation at critical periods, and in other ways. S species endure high alkalinity, others salinity, whe still others grow in mucky soils or in bogs. Thus acreage occupied by browse is enormous. In (fornia alone the sclerophyllous browse type, or cha ral, occupies thousands of acres at elevations im diately below the commercial timber belt; and the g sagebrush formation of the Great Basin and Ro Mountain regions is even more extensive.

Ecologists have classified the browse types of United States into various formations and associati The classifications most generally adopted are thos Shantz and Zon, of Harshberger, and of Clements.

Although browse vegetation does not afford as m food or as high a quality of food for livestock as graminaceous cover, it is enormously important western ranges, especially during periods of drou Because it has a deeper and much more extensive r system, its annual yield of leafage and twigs fluctu less than the forage yield of grasses and other he Browse plants with bland juices are more likely to cropped than those the sap of which is acid, very bit or astringent. Not all the delicate variations in bit ness, however, cause animals to reject plant leafa and the saline taste characteristic of so many bro species peculiar to alkaline habitats, notably those the goosefoot family, is generally agreeable to livesto

The browse feed of the West is largely encompas in some 24 families and 60 genera. Six families a about 17 genera include poisonous species. N plant families are of outstanding importance in th contribution of palatable browse plants. The r family (Rosaceae), including as it does the mounta mahoganies and bitterbrushes, is one of the m valuable. On the other hand the legume family, famous for its herbaceous forage plants, contribu little browse feed. The members of the heath fami likewise, are of low palatability; indeed, many spec of azalea, rhododendron, Labrador-tea, and ot ericaceous genera are toxic and annually cause rat heavy losses among sheep.

After a brief introduction covering these poin important genera under the respective families are d cussed in alphabetical order. Even the genera of t Pinaceae are discussed from the point of view of inju by browsing under conditions of overgrazing. In t discussion of each genus one or more so-called "key species are treated in some detail, with notes on th distribution. Following this, brief notes are given other important western species. Finally the brow plants are classified according to uses or properti into groups such as plants with edible fruits, seeds, a nuts; plants yielding latex (lac, rubber, sugar, etc. ornamentals; poisonous species; and outstanding gene and species of habitat indicators. The illustrations a gely pen-and-ink drawings, all but two of which were de by the well-known artist Mrs. A. E. Hoyle. The plications cited are numerous and well selected.

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[8] Published by the U. S. Department of Agriculture as Circular 134 and Technical Bulletin 223, respectively. Copies can be obtained free of charge, as long as the supply lasts, from the Office of Information, U. S. Department of Agriculture, Washington, D. C.

[9] U. S. Department of Agriculture Miscellaneous Publication No. 101. Copies may be obtained free of charge, so long as the supply lasts, from the Office of Information, U. S. Department of Agriculture, Washington, D. C.

This bulletin may truly be said to mark an epoch in study of browse plants. It might have been someat more useful had there been a fuller table of conts. The too brief table of contents which it indes is, however, largely supplemented by an elabo- index that is indeed a check list of the genera.

'o those interested in browse vegetation chiefly as er to prevent erosion the bulletin is likely to be disointing; it discusses such subjects as soil-binding racters, root-system network, etc., only incidentally. o, less space is given to the life histories of important cies than I had anticipated. There remains now the task of determining the relative nutritive qualities important species of the various browse types at erent intervals during the browsing season, and the siological reactions of these important plants to erent seasons of use and intensities of use. That must enlist the interest of many scientific agencies. the meantime Important Western Browse Plants fill a long-felt need of foresters, range technicians, l stockmen.

asticity of the Root System of Corsican Pine in Early Life

By J. H. PRIESTLEY, University of Leeds, England

om Forestry, the Journal of the Society of Foresters of Great Britain, June, 1931)

'he Plasticity of the Root System of Corsican Pine Early Life, an interesting paper by R. N. Aldrichke, includes the results of studies in progress since 3, but such is the complexity of both the practical l scientific problems involved that the results, though y valuable and suggestive, can only be regarded as liminary.

'he Corsican pine has proved very difficult to estab- in plantations in Great Britain, so that the author taken up, for the Forestry Commission, an inten- study of the behavior of the root system of the dling under various conditions of growth in the sery or when sown directly in the plantation.

Ve know as yet very little about the morphology of root system of the tree, and the section of the paper ling with this problem makes a distinct contribution a field of work which is necessarily very laborious l time-consuming. Of recent years data on these jects have been accumulating, especially in hortitural literature (see, for instance, V. A. Kolesnikov, the root system of fruit trees, Journal of Pomology l Horticultural Science, viii, 197–209, 1930), and ry new contribution only deepens the impression t fundamental studies on these lines will give most p in the end in dealing with many practical blems.

n interesting point is suggested by the ingenious dy in this paper of the order of appearance of sucsive root primordia. They appear, of course, in acropetal order, but, in a tetrarch root, the next lateral apex to emerge is not usually found opposite the preceding one but more usually emerges opposite one of the adjacent protoxylem groups. When lateral root meristems emerge, therefore, they do not obey Hofmeister's rule, which seems to be the fundamental developmental procedure governing the successive emergence of leaf primordia at a shoot apex. The laws governing leaf emergence are the subject of a vast literature; this paper underlines the significance of our lack of knowledge about the emergence of root initials, as it would appear that, if the upper inches of the taproot system were better furnished with vigorous secondaries, bearing in their turn a crop of vigorous tertiaries, most of the problems in the way of establishing the Corsican pine would vanish.

The author distinguishes very clearly between four different types of roots or root regions: (1) The tap root or radicle; (2) mother roots, usually diarch, relatively short and freely clothed in branches; (3) pioneer roots with expanded stele, more groups of protoxylem and with vigorous elongation growth at the expense of aborted branches; and, lastly, (4) small branches dichotomizing early into monarch rootlets heavily infected with mycorrhiza. The "pioneering" habit carries a large part of the root activity in this tree down to unexpected depths at an early age. Sowing in the plantation having so far proved a failure, the success of transplantation seems likely to depend upon keeping the root system of the slower growing "mother root" type well endowed with branches. Root pruning in the nursery bed was attempted, cutting either the tap root or the secondaries, and the results may be slightly beneficial in the production of additional branches. The reviewer has seen this plan of cutting the tap root in regular use by Mr. Corbett, the forester to the Pacific Lumber Co., in his nursery of redwood (*Sequoia sempervirens*) at Scotia, Calif. Careful observations in the Corsican pine seem to show definitely that the value of transplanting is not to be attributed to the production of more branches in the upper part of the root system, although undoubtedly transplanting means very rigorous destruction of the lower part; the success of the process undoubtedly lies in the salutary check given to shoot growth, which in view of the slow-growing habit of the seedling in transplantation, is not the most desirable way to bring about its survival if others could be found. The author has tried the effect of humus and also of nitrogen fertilizers in the nursery, but though more vigorous growth of seedlings is thus obtained, root growth gains in root length not in number of secondaries and short absorbing branches useful when transplanting.

The whole problem affecting the type of root growth in the plant is very fascinating. Many observations, in addition to those of Brenchley and Jackson, which are quoted, draw attention to the existence in the same plant of two types of root, one branching freely, the other of different growth habit and unbranched. In

Thladianthus and in some monocotyledons the unbranched region has a dilated stele and is generally thickened, whilst the narrow root regions branch freely.

In the strawberry and the apple, the different types are formed at different seasons; in fact, many horticultural observations stress the significance of these different types of root. The author seems inclined to think that the addition of any other mineral nutrient might be expected, like nitrogen, to favor shoot growth relatively to root growth, but in view of some of the recent horticultural experience with cultures of fruit trees, potash and phosphate manures might prove worthy of trial in the nursery.

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FOREST WORKER

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Announcements

Research Fellowships Offered by University of Washington

Three research fellowships in forestry, one for $700 and two for $600 each, have been made available at the University of Washington for the year 1932–33 through the establishment of the Agnes Healy Anderson Research Fellowship Fund. Applicants for these fellowships must have received a bachelor's degree equivalent to that offered in forestry or in a field closely allied to forestry by the University of Washington. Applications must be received by the university not later than March 15, 1932. A special form for application wi be supplied by the dean of the college of forestry upo request. It is desirable, but is not required, that eac applicant submit a thesis showing ability to do original research work. Fellows may become candidate for the master's degree.

American Scientific Congress

The Mexican Government has decided to hold i November, 1933, the Seventh American Scientifi Congress, originally scheduled to be held early in 193 The congress is to take place in Mexico City.

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FOREST WORKER

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State Forestry

Visconsin Plans to Afforest 10,000 Acres Annually

The Wisconsin Conservation Commission plans to ant forest trees on 10,000 acres of land annually eginning with 1932, to develop at least one more rest tree nursery, and to intensify its efforts to ncourage private and cooperative public reforestation rojects. In 1932, in order to begin planting on the ale of 10,000,000 trees a year, the commission plans supplement the output of the Trout Lake forest ursery by large purchases of forest planting stock. he proposed expansion of nursery facilities would able the commission to supply annually 10,000,000 ees for State planting, 1,000,000 trees for planting cooperation with the State board of control, and lditional quantities of planting stock for use in other iblic enterprises and for distribution to the public.

Hitherto, the State's forest planting has been done rincipally on pine lands; the new planting program ys an increased emphasis on the planting of spruce provide material and encouragement to pulp and iper industries. The commission's committee on rest planting estimates that a net productive area approximately 1,580,000 acres in continuous proiction and under intensive forest management is quired to supply the needs of the paper mills now erating in the State.

The locations recommended by the planting comittee for the 1932 planting are as follows: Northern id American Legion State Forests, in Vilas and neida Counties, 6,000 acres; State lands in Marinette ounty, 1,000 acres; Brule River State Forest, in ouglas County, 1,000 acres; proposed Central Couns State Forest, 2,000 acres. In 1933 the committee commends a continuation of the work on these sites id a beginning on others, the latter to include the anting of 500 acres on the proposed Kettle Moraine ate Forest.

* * *

Additions to New Jersey's State forests during the iarter July 1, 1931–September 30, 1931, totaled 967 res and were acquired at an average cost of $8.45 r acre. The State forest receipts during that period, om timber sales, leases, and rents, amounted to $3,777.

Recreational Use of State Forests

By William G. Howard, Superintendent of Lands and Forests, New York

It has come to be pretty well recognized that State forests, particularly in the thickly settled parts of the country, are fully as valuable for the recreational opportunities they provide as for the saw timber or pulpwood they may produce. I claim no great credit as a forester for making this announcement. On the other hand I make it with humility, knowing that foresters have been among the last of our citizens to appreciate this fact.

Badly as we are in need of timber and other forest products in this day and age, much as we of the Eastern States should like to produce our own timber and thus save the millions of dollars we pay each year for freight on lumber imported from the West and South, anxious as we are to see our own wood-using industries assured of an adequate supply of raw material—in spite of all these considerations, which have been important factors in bringing about the establishment of State forests, we must realize that the relatively small area of such forests may be vastly more important in the recreational opportunities it affords than in its effect on timber-supply problems.

The New York State Forest Preserve was created 45 years ago through setting aside Adirondack and Catskill lands acquired by the State as a result of tax delinquency. At that time the use of the forest for recreation was almost negligible. Forest industries, exemplified by sawmills, paper mills, and tanneries, were numerous and thriving. At the same time forest lands were cheap, and a few far-sighted people realized the advantages of investing State funds in this class of property. The result was the appropriation of $4,075,000 from 1890 to 1909 for the acquisition of land for the forest preserve.

While relatively little use was being made of the forest for recreation in those early years, it is apparent that the future possibilities for such use of the State forest preserve were not entirely overlooked by the originators of this movement. These people had in mind also the protection of the watersheds of important streams, and particularly the preservation of a future timber supply. As a matter of fact, during the early years of the forest preserve the cutting and utilization of timber from State lands was permitted by law. The State department having jurisdiction over the forest preserve was not adequately manned to handle timber sales efficiently, however, and as a result abuses crept in which led to a constitutional amendment prohibiting the cutting and sale of timber on the forest preserve.

Public interest in the recreational possibilities of the forest preserve began to manifest itself by the end of the first decade of the twentieth century, when automobile touring really began. A rapidly increasing mileage of good roads made both the Adirondacks and the Catskills easier to reach than ever before. Public sentiment engendered by enjoyment of the woods made it easy to get bond issues of $7,500,000 in 1916 and $5,000,000 in 1924 to add to this great public forest property.

When the money from the first of these bond issues became available in 1917, it was obviously necessary to formulate a policy for land acquisition. The policy adopted at that time has proved satisfactory and has been followed ever since with remarkably few changes. The more important of the purposes that govern the selection of lands for acquisition for the forest preserve are:

1. To extend State lands suitable for public recreational use and to protect natural features having æsthetic value.
2. To assure the maintenance of protection forests on the watersheds of important streams.
3. To consolidate State holdings and thus facilitate administration.
4. To perfect the State's title to lands and reduce the cost of litigation.

Lands suitable for recreational use are of many classes, ranging from well-timbered areas in the high mountains to less well-timbered but more accessible land adjacent to the public highways where more public camp sites are needed. The lands acquired under the bond issue have been particularly well selected as regards the extending of the areas available for recreational use, that is for hiking, hunting, fishing, camping, and the like. The high mountains purchased in some cases primarily for watershed protection are the areas most attractive to the hiker and mountain climber. Areas of less rugged topography with attractive water courses appeal to those who desire to hunt and fish, or to have a place to camp with their families over the week-end. Lands acquired under the bond issue include tracts easily accessible from each large town or city adjacent to the Adirondacks. Acquisition has been divided proportionately between the Adirondack and Catskill Forest Preserves and has been extended in all directions with the result that additional State lands have been made available to communities tributary to all parts of the forest preserve.

In purchasing certain areas of high mountain sl
with the purpose of preserving æsthetic features
the landscape the State has had the cooperatio
private organizations.

Public recreational use of the State forest prese
reached very considerable proportions as early as
years ago; it was not until 1920, however, that
definite steps were taken to develop the recreati
facilities of the preserve. At that time an excell
system of State highways gave access to the St
land, but there were no areas developed for camp
and no official trails giving access to the interior exc
those that led to fire-observation stations.

An appropriation of $2,500 in 1920 made it possi
to begin developing public camp sites and a system
trails. Not much could be done with this amou
but the work was received enthusiastically by the pul
and appropriations were soon increased to substan
amounts. After 10 years of effort along this line th
are 29 large public camp sites with a capacity of 30,
campers, embracing an intensively developed area
more than 200 acres. More than 400 miles of tr
in the Adirondacks and 100 miles in the Catskills ha
been thoroughly signed and marked for the use
hikers. A total of 141 open shelters have been plac
along the trails and waterways of the forest preserve.

While every effort has been made to provide sa
sanitary camping places for the public, no luxur
have been installed nor has anything been done
interfere with the wilderness character of the fore
preserve, which is one of its chief attractions.

In spite of the rapidity with which these develo
ments have proceeded, they have hardly kept pa
with the demand. At 21 of our larger public car
sites 129,000 persons were registered in 1929, 267,0
in 1930, and 437,000 in 1931. These figures, of cour
do not include campers at smaller public camp sit
where no rangers were in attendance, and include on
a small proportion of the many travelers who enjoy
the beauties of the forest preserve from the highway
Furthermore, it does not include the host of sport
men who derived enjoyment from fishing and hunti
on forest-preserve land. It is certain that practical
all the holders of deer-hunting licenses, 75,000 in 193
hunt in the Adirondacks and Catskills, and most
them at one time or another on the State fore
preserve.

Under a new reforestation law passed in 1929 pr
viding for State acquisition and reforestation
abandoned farm lands, appropriations of $400,000 ar
$600,000, respectively, were made in 1930 and 193
Recently the voters approved a constitutional amen
ment that assures the appropriation of $19,000,0
more for this purpose. The lands thus far purchas
by the State under this law total 73,000 acres, includi
80 areas located in 18 counties. They have bee
planted just as fast as they have been acquired. Th
reforestation areas have been opened to the publ

r hunting and fishing. Conservation Commissioner
orgenthau has made a special effort to see that every
re of these lands was marked as a public hunting
ound as soon as it was acquired, and he has broad-
st an invitation to the sportsmen of the State to
joy their sport on these publicly owned lands.

The present intensive use of our forest preserve by
e public demonstrates the value of these forests to
e citizens of our State and others for recreational
rposes. If the increased health and happiness
sulting from recreational facilities provided by a
mplete and adequate system of State forests could
measured it would prove, I am sure, not only that
ate forests are a good investment for any State but
at no State can afford to be without such public
ests.

Twenty-Year-Old Spruce Plantation Marks Buchanan's Birthplace

A plantation of Norway spruce described by District
rester H. B. Phillips as one of the oldest and thrifti-
t in the Pennsylvania State forests marks the birth-
ace of James Buchanan, fifteenth President of the
nited States, at the Buchanan State Forest Park, in
anklin County, near McConnellsburg. The planta-
on was established in 1913 under the direction of
rester Alfred E. Rupp, now chief of the bureau of
rest management of the Pennsylvania Department
Forests and Waters. Three thousand small 3-year
ansplants were set out 4 feet apart each way, in a
ace that in former years had been used as a garden.
e plantation was successful from the beginning. A
mple plot of one-tenth acre, including 321 trees, was
tablished on the plantation in 1931. In February,
31, the average diameter of the trees on the plot
as 3 inches.

Some pruning is being done on the trees and it is
anned to carry out a light thinning operation within
e next few years.

◆

Since 1920 the Los Angeles County Forestry Depart-
ent has constructed 405 miles of firebreaks along
ountain ridges. In addition it has built 197 miles of
ails, established 21.45 miles of motor ways, and strung
1 miles of telephone lines. Motor ways are one-way
ads, not open to the public, which serve the double
rpose of firebreaks and means of access to areas
here fires are likely to occur.

◆

Equipping a truck for use in fighting forest fires costs
ly $125 if done according to a plan devised by the
lorida Forest Service. The equipment consists of a
n belt power take-off, a 100-gallon tank, and a reel
at turns in all directions. One of the convenient
atures is an outlet for filling hand pumps which has
n automatic shut-off similar to those used on gasoline
nks.

Minnesota Develops New Forest Nursery

A new forest nursery authorized by the Minnesota Legislature in its 1930 session is being developed by the State division of forestry in the northeast quarter of section 16, township 139, range 32, a part of the projected Badoura State Forest. There have been constructed a main cabin or office, a bunk house, a warehouse and garage, an ice house, a water reservoir with a capacity of 22,000 gallons, a compost tank that will hold 75 tons of material, and a workshop and storehouse. About 7 acres of land have been cleared, plowed, and harrowed. Under present plans this area will suffice for the next three or four years. Seed beds 4 by 12 feet have been prepared, in compartments of 64 beds each. Northern white pine, Norway pine, and white spruce have been planted in 108, 111, and 37 beds, respectively. A plowed firebreak 2 rods wide borders the nursery on the two sides not bounded by county highways.

A New Transplant Nursery for Indiana

The Indiana Department of Conservation has decided to establish a transplant nursery at the Shakamak State Park, near Jasonville. Large numbers of trees will be required to reforest open areas in this park, a considerable portion of which consists of old fields. Stock grown for planting in the park will include as large a percentage as is practicable of native hardwood species. Evergreens will be grown for planting on soils too poorly drained or too low in fertility for hardwoods.

A second purpose in establishing this nursery is to supply large transplant stock for the reforestation of stripped-over coal lands near by. It is estimated that there are more than 15,000 acres of such lands in southwestern Indiana. The coal operators have agreed on a comprehensive program for cooperative tree planting.

At the Henryville State nursery the area under cultivation has been expanded to 28 acres. In the fall of 1931 this nursery contained 19,750,000 trees, of which 1,000,000 were moved to transplant rows during that season.

◆

During the fall of 1931 the district foresters of Pennsylvania collected for use in the State forest-tree nurseries 500 bushels of black walnuts, 33 pounds of sugar-maple seed, 50 pounds of white-ash seed, 10 bushels of yellow-poplar seed, 24½ bushels of northern white-pine cones, 9 bushels of pitch-pine cones, and 9 bushels of red-oak acorns. In addition George S. Perry, of the Pennsylvania Forest Research Institute, collected 5 bushels of mountain-pine cones from which 1½ pounds of clean seed were produced to be shipped to Russia for experimental planting.

Pennsylvania Oaks Die After Borer Attack

When Josef Knull, Pennsylvania forest entomologist, visited certain parts of Clarion, Venango, and Forest Counties last fall to observe dying oaks, he found that practically all the dead and dying trees were infested with the two-lined chestnut borer. A combination of troubles had preceded the borer attack: Lepidopterous defoliators had been plentiful through certain parts of the Allegheny Plateau for several years; in the spring of 1930 large areas of the plateau were visited by a late frost which killed all the young foliage, making large forest areas look as if they had been burned over; and the 1930–31 drought had lowered tree vitality. The ring growth on many of the dying dominant trees showed retardation over a period of about five years. Mr. Knull's observations led to the opinion that some of the oaks which he found dead and dying would have died even if the borer had not attacked them, but that many would have survived except for the borer attack.

No white oaks were found to be dying.

Deaths of oak trees had been reported during the year from all parts of Pennsylvania.

The larvæ of the two-lined chestnut borer work beneath the bark and cut off the tree's food supply. The insect does not attack healthy fast-growing trees. Mr. Knull states that control measures on large wooded areas are impracticable from a commercial standpoint; for oaks that are especially valued and that are in danger as a result of a combination of adverse conditions such as has just been described he recommends a springtime treatment of fertilizer together with liberal applications of water. Another way to protect valuable trees from the borer, he suggests, is to spray them with an arsenate of lead solution about the first of June.

* * *

Ohio's two State forest-tree nurseries distributed 3,569,855 trees for planting in 1931, exceeding their record for any preceding year. Twenty-six plantings on State lands required 1,031,927 of these trees. The distribution of the remainder, with numbers and classes of planters, was recorded as follows: 823 farmers, 1,754,631; 30 municipalities, 571,119; 6 mining companies, 61,800; 15 organizations and clubs, 114,075; 8 institutions, 23,895; 5 Scout organizations, 9,730; 13 miscellaneous, 2,678.

* * *

Orders issued to Georgia highway forces direct them to assist in fire control at the call of representatives of the State forest service whenever possible. Road forces are instructed also to suppress fires starting along highways.

* * *

Vermont's State forests and forest parks now number 22 and have a combined area of 40,070 acres.

New York Warms Up for a Great Reforestation Effort

The performance of the New York State forestr organization in reforesting 28,000 acres of land in 193 has been acclaimed by Conservation Commissione Henry Morgenthau, jr., as fully demonstrating th practicability of carrying out the reforestation pr gram embodied in the State's recently adopted refor estation amendment. The commissioner's words wer as follows:

> In this, the second year of the enlarged reforestatio program, the crews working under the direction William G. Howard, superintendent of the division lands and forests, have completed reforestation 28,000 acres of land, while the quota set for this yea was only 15,000 acres. They have made up a defi ciency of 5,000 acres from last year, caused by delay in clearing titles, and have added 8,000 acres beyon the combined quotas for the two years. In doing thi they have not only established a pace for the wor which puts them a year ahead of schedule, but the have established the fact that it will be a relativel simple matter to expand nursery and planting facilitie at the rate required by the program, which rises a the rate of 10,000 acres a year to 100,000 acres in 1904
>
> Obviously, to reach this rate we shall have to increas our nursery operations by steady progression so as t have enough trees of the right age to plant each yea The necessity of planning the work and starting opera tions at least five years ahead of field planting is on of the chief reasons why the amendment, setting up long-time schedule, is of such great importance.

Under the provisions of the reforestatino amend ment added to the New York constitution by action o the legislature and the voting public, $1,000,000 wi be made available to the State conservation com mission in 1932 to buy 50,000 acres of idle land an reforest 20,000 acres. The annual appropriation mad mandatory by the amendment will increase by $200,00 in each of the succeeding five years, becoming $2,000, 000 in 1937. That year's program will call for th purchase of 100,000 acres of land and the reforestin of 70,000 acres. The annual appropriation and th acreage to be purchased annually will remain constan from 1937 to and including 1942, at which tim appropriations under the amendment will reach th total of $19,000,000. The reforestation operation will cover at least 1,000,000 acres of land.

The program involves establishing additional fores nurseries capable of producing a maximum of 100,00 trees annually.

* * *

The Farmers' Federation, with headquarters at Asheville, N. C., which has for some time maintained a department for the cooperative marketing of farm fores products, now has its own nursery for the propagatio of forest-tree seedlings suitable to be planted in th North Carolina mountain section. One feature of th planting plans which H. Rotha, manager of the department, has under way is a program to encourage th planting of native trees along highways.

Slash Pine Seems to Feel at Home in Texas

Although the natural range of slash pine has its
stern limit in eastern Louisiana, the tree gives
omise of usefulness as a species to be grown for pulp-
od in east Texas. Slash pines set out on the State
rest near Kirbyville, Tex., in 1926 now average 12
t in height, the Texas Forest Service reports. The
gest trees in the plantation are 19 feet high and 3.5
hes in diameter. In order to obtain further data
the adaptability of this species to Texas conditions,
ntings of from 1,000 to 7,500 slash pine seedlings
h were made in December, 1931, on 15 representa-
e areas scattered through the east Texas commercial
ber region.

◆

A $5,000 appropriation made by the city of Oneonta,
Y., for unemployment relief in the winter of 1930–31
s used to make firebreaks and improvement cuttings
on the city's 1,200-acre watershed-protection forest. The material cut was used by the unemployed as fuel.

◆

Seventy-five thousand board feet of lumber and timbers needed for the construction of a barn and other buildings on the Morgan-Monroe Counties State Forest of Indiana will be cut from the forest itself. About $1,500 will be paid locally for labor and the use of teams.

◆

On the Windsor-Spring property, near Augusta, Ga., is a plantation of shortleaf pines that was established just after the close of the Civil War. Measurements made a few months ago by E. Bauer, of the South Carolina Forest Service, and Charles W. Nuite, forester of the Kershaw County Forestry Association, revealed that the trees average 73 feet in height and 14½ inches in diameter at breast height. No record of the planting is available, but increment borings indicate that the trees are 66 years old.

Education and Extension

ichigan State College to Reforest Farm Land Given by Kellogg

A demonstration of methods of reforesting infertile
rm land in southern Michigan is to be established by
e Michigan State College on a 360-acre tract of
andoned farm land given to the college by W. K.
ellogg, of Battle Creek. The tract is located 10
iles to the north and west of Battle Creek, close to
e Kellogg wild life sanctuary and demonstration
rm. A plan is being prepared under the direction of
A. Herbert, head of the forestry department of the
llege, for planting the area with forest trees at the
te of approximately 40 acres per year. Use will be
ade of all the tree species known to be adapted to the
nditions existing on the area and the trees will be
anted by various methods and in various spacings and
rangements.

ouis Marshall Memorial Approaches Completion

The corner stone of the Louis Marshall Memorial,
e new science building of the New York State College
Forestry, was laid by former Gov. Alfred E. Smith on
ecember 4, 1931, the college's twentieth anniversary.
he building is now about two-thirds completed, and
dedication is expected to take place next summer or
rly in the fall.

The Louis Marshall Memorial will be 240 feet long
d 62 feet wide, with a rear wing 60 by 70 feet extend-
g from the center of the south wall, and will have
four stories and a basement. It will include a library having a capacity of 50,000 volumes and seating 90 persons. It will house the departments of silviculture, forest zoology, entomology, and botany, and the Roosevelt Wild Life Experiment Station. The departments of forest chemistry and wood technology, and the administrative offices, will remain in the old building.

Michigan College Offers Planting Stock at Low Prices

The tree price list issued by the department of forestry, Michigan State College, for the spring of 1932 includes quotations on 13 kinds of stock for forest, windbreak, and Christmas-tree planting. The 4,000,000 trees available for spring planting are being offered at record low prices. One thousand 2-year-old seedlings, enough to plant an acre of land, can be obtained at prices ranging from $2 to $4. Transplant stock especially suitable for windbreak and Christmas-tree plantings is offered for as little as $1.25 per 100. Professor Herbert urges that Michigan landowners who have land suitable for forest planting plan to reforest it this spring when the cost of planting is unusually low and the work will be a help to the unemployed.

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Lime soil and irrigation have proved to be ideal conditions for rapid growth of black locust trees in southern Idaho, where the locust borer is unheard of, writes Extension Forester Stanley C. Clarke. They enable the trees to grow to fence-post size in less than 10 years.

Four-H Forestry Clubs in the Central States

By R. A. TURNER, United States Agricultural Extension Service

Four-H forestry clubs have now been organized in more than half of the 13 Central States, with approximately 2,000 members enrolled.

This project is carried on with the expectation that, through this phase of extension work, farm boys not only will come to have a better understanding of the forests which are about them and be led to recognize the existence of our forestry problems but will also learn how to conserve our present wooded areas and will become interested in providing forests for future use.

The practice and knowledge gained from satisfactorily completing the requirements of this project do not necessarily make foresters of the boys, but they do equip them with the ability to appreciate the forests, to handle and protect the wood lots on their home farms, and to participate in reforestation and forest fire prevention activities.

Four-H forestry clubs are supervised by the extension service in the State concerned and the Office of Cooperative Extension Work, United States Department of Agriculture, cooperating. The organization of forestry clubs is under the direction of the State club leader and the county extension agent. Material pertaining to this project is prepared under the supervision of the State extension forester. The local club leader directs the activities of the boys who enroll in any given local club.

Among the activities in which 4-H forestry club boys engage are the reforestation of land areas on their home farms or of land obtained for this specific purpose, the planting of windbreaks or shelter belts about the farmstead, making improvement cuttings in the farm woodlot, gathering tree seed for their own use or for sale, and establishing private nurseries with the purpose of growing their own planting stock. The great majority of 4-H forestry club members reforest a certain land area each year, looking toward the future ownership of a sizable piece of growing timber. Forestry pageants are presented; exhibits are made at county and State fairs; demonstration teams are trained; hypsometers, calipers and Biltmore sticks are made and used; firebreaks are constructed when the size of the timbered area warrants; wood-utilization plans are inspected; and tree-identification hikes are taken. In certain States the State authorities recognize the work of the older 4-H forestry club boys by appointing them as assistant State fire wardens.

Wisconsin leads the way in the establishing of school forests. Usually some local organization, such as a lumbering company or a chamber of commerce, deeds the land to the school. Each year the club members reforest a definite area, so that within a stated number of years the entire area will be covered with growing trees of varying ages. Both Wisconsin and Mich hold forestry club camps where instruction is give trained foresters and where the boys enjoy the ex ence of camping out.

Iowa conducts a farm grove history contest w familiarizes farm youths with the history of the w lots on their home farms. In Minnesota a civic f is now being developed by a forestry club which i tuted the plan with the assistance of village authori In the mining section of Minnesota the boys someti utilize ore dumps as areas upon which to carry their planting plans. Ohio boys who live in the c mining section often do their planting on the r strips when other land is not obtainable.

Catalpa Proves a Profitable Crop

By F. W. DEAN, Extension Forester, Ohio

In 1904 and 1906 A. B. Canfield, of Fayette, Ful County, Ohio, planted 25 acres of catalpa. In th days, 25 years ago, reforestation was in its infancy a man had to be strong at heart to start such a ta This was one of the earliest catalpa plantings in county and probably the largest in this section of State. On a recent trip through northwestern Ohi was the pleasure of County Agricultural Agent H mon and myself to accompany Mr. Canfield thro these plantings, now a woodland of good-sized cata trees that are rapidly maturing into a crop of fe posts and telephone poles.

Mr. Canfield picked out an excellent site for trees—good black soil adjacent to overflow land. object in planting the trees was to square up fie that had been made irregular by a cross-cutting stre and also to furnish the farm with a dependable sup of posts. At the time when the land was planted could not have been cropped successfully for co because it was subject to overflows and was not drain Since that time surrounding land has been impro by a large drainage ditch, yet Mr. Canfield has not sorry that he planted the catalpa. For 15 years has been cutting posts and using them on his 340-a farm. Since 1920 he has been selling an average about $150 worth of posts per year. Yet you can har see where the posts have been cut, except in one p where it was necessary to make a heavy thinning. addition to the posts used on the farm and those so Mr. Canfield has obtained from his catalpa plantati a quantity of cordwood, which he cut from the to When properly seasoned, catalpa makes excellent fi wood.

The trees were originally spaced 8 feet apart ea way, or about 700 to the acre. In all, Mr. Canfie planted approximately 15,000 trees. He cultivat them for two years and then let them take care themselves. The trees have always been protect from livestock and show vigorous healthy growth.

Ir. Canfield estimates that the plantation still tains the material for 50,000 posts. At 10 cents ece stumpage for the posts this means that as the year catalpas now stand they have a value of 000. In addition, in this flat country the grove has n an excellent protection to the surrounding farm ps and buildings, proving its worth not only in the duction of posts but also as a shelter belt.

djacent to the catalpa Mr. Canfield planted at the e time small plots of black locust, white ash, and ssian mulberry. The black locust in a few years destroyed by the locust borer and the Russian berry on account of its poor form has not produced ts of merchantable size. The white ash has made ellent height growth but has not attained com- cial size.

Method of Controlling the Strawberry Root Weevil in Forest Nurseries

ONALD J. WEDDELL, Kellogg Fellow in Forestry, Michigan State College

he strawberry root weevil (*Brachyrinus* [*Otio- nchus*] *ovatus*) is attacking in great numbers the iferous nursery stock of the Michigan State College sery. This weevil, known also as the crown ller, first appeared in epidemic form in the nursery ing the spring of 1929. Since that time it has eased in numbers and has caused damage of easing extent. It has been found working in beds Norway spruce, white spruce, western white pine, rway pine, northern white pine, jack pine, Japanese h, tamarack, and northern white cedar.

uring the fall of 1931, control measures on a large le were carried out. Use was made of a carbon lphide emulsion, prepared according to the fol- ing formula:

Bentonite, 1 quart.
C. P. O. soap, 2 quarts.
CS_2, 3 quarts.
Water, 2 quarts.

n an area of 2,340 square feet from which 3–0 ite spruce had just been removed and which was vily infested with the weevil, carbon disulphide ulsion was applied in solutions as follows, according the soil temperature:

40° to 50° F., 13.6 c. c. per gallon of water.
50° to 60° F., 11.4 c. c. per gallon of water.
60° to 70° F., 9.0 c. c. per gallon of water.

he solution was mixed in a 150-gallon "Bean" ayer. One filling of the sprayer was used for 60 are feet of area, the material being applied at the e of 2½ gallons to the square foot. A rectangular rd frame 8 inches deep inclosing 60 square feet of a was used to hold the solution until it could soak o the ground. The outside of the frame was nked with soil to prevent leakage.

Eighteen gallons of solution and 44 hours' labor (22 hours for each of two men) were required to treat 2,340 square feet of nursery beds. The cost of the operation was as follows:

44 hours' labor at $0.50	$22.00
18 gallons of emulsion at $0.65	11.70
Total	[1] 33.70

After the operation a check at intervals of a few feet disclosed no live larvæ on the treated area.

In order to combat the weevil successfully it will probably be necessary to combine the carbon disulphide emulsion treatment with one or more other control measures. Application of the emulsion to those parts of the nursery that are worked, at the time when most of the weevils are in the larval stage, will destroy the majority of the insects. The next step should be to surround the treated area with poison bait in order to keep out adult weevils. (The adults are wingless.)

It is expected that control measures will have to be carried on for several years before the number of weevils is reduced to a point at which the damage will be negligible.

Trees Are Prizes for Forestry Essays

Six thousand tree seedlings from Washington's State forest nursery at Pullman were offered as prizes in a forestry essay contest sponsored this winter by the State College of Washington, concluding December 31. All 4–H club boys and girls enrolled in 1932 projects were eligible. The subject was Why Should Forest Trees Be Planted in Our Community? A first prize of 100 seedlings and a second prize of 50 seedlings were to be awarded in each county; the winners of first, second, and third place in the State as a whole were to receive, respectively, fifteen, ten, and five 5-year-old transplants. The prize trees, which will be distributed in April, will be selected by foresters of the college faculty with particular reference to soil and climatic conditions in the localities where they are to be planted.

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The extension school of forestry held by the College of Agriculture of the University of Arkansas in December, 1930, was repeated in December, 1931, at Camden, Ark. Three half-day sessions devoted to talks on forest economics, wood utilization, and forest-fire protection were followed by an inspection tour of the paper mill of the Southern Kraft Corporation.

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The Pennsylvania State College has 196 forestry students in attendance this year, including 61 freshmen and 26 ranger students.

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[1] Equals $0.014 per square foot.

Forest Service Notes

Fringes of the Southwestern Pine Type

By Quincy Randles, United States Forest Service

The western yellow pine type in Arizona and New Mexico is found most commonly at elevations between 7,000 and 8,000 feet, or below the Douglas fir type. At its lower elevation it is bordered by scattered scrubby individuals of western yellow pine, by stands of piñon and juniper, and by open grassland. Inside the type are found areas of open grassland, locally called parks, which show no evidence of ever having carried a stand of timber. The same is true of the open grassland at the border. Mixed with the piñon and juniper are occasional specimens of pine, and extending down the watercourses for several miles is a belt of pine confined to the narrow valleys and to good moist soils.

Reproduction within the western yellow pine type proper is the result of a good seed year followed by a couple of years of favorable weather conditions, such favorable combinations occurring at long intervals, and of the starting of a few seedlings per acre at much shorter intervals. Reproduction of western yellow pine is now noted in many places in the so-called parks and in the grassland on the border of the type, and to a lesser extent in the bordering piñon and juniper stands and in the scattered pine stands. This reproduction is usually less than 30 years old. In places the extension is confined to scattered individuals in a narrow belt; in other places it amounts to almost full stocking in a belt a mile wide.

While the total area involved by this extension is not great compared with the area of the western yellow pine type in the region, since the region is so lightly timbered the extension is of value, occurring as it does at lower elevations where any merchantable product resulting from it will be accessible to local users.

The causes of the spread have not been definitely determined. Climatic records for the region do not extend farther back than 50 years. A study of these records discloses no marked tendency toward an increase of moisture. The wind disseminates the seed, either carrying it or blowing it along on crusted snow.

It is, of course, recognized that fires in the Southwest are much less frequent and are also less severe than they were 30 to 50 years ago before the grazing of livestock utilized the grass. Formerly the grass was only very lightly used by game animals and the unused portion formed a mat on the ground. At that time rodents were no doubt more plentiful, since the unused grass supplied them with food, shelter, and protection. It may be assumed, therefore, that more tree seed and young trees were destroyed by rodents than at present. Also, the heavier grass cover would prevent many tree seed from reaching mineral soil and would choke many of the tree seedlings that germinated. believed that utilization of the grass and a decrea fires and in destruction of seed and trees by rodent responsible for the encroachment of reproductio the grassland in and adjacent to the pine type.

It remains to be seen whether the extension of type can maintain itself against the violent fluctuat in rainfall so common in the region. Droughts of or three years' duration occurring within the past 2 30 years have resulted in the dying out of this repro tion on certain areas. It is believed, however, tha many places the extension will be permanent and offer better protection to the type immediately bac the fringe.

The Forest Survey is Washed Ou

By C. M. Granger, United States Forest Service

Just when Gus Lentz and his amphibians are re to go into quantity production on the survey of bottomland hardwoods in Mississippi, Ol' Man Riv little boy, the Tallahatchie, rampages all over the place they want to work. There being limits to w even a duck can do with water, they may be somew delayed in putting the 1932 model of the forest sur machine, southern type, into operation.

Turning to the drier aspects of the subject, we report that the tryout of the line-plot method in parishes (counties) in Louisiana has been comple and the data analyzed. The test run was made w lines 3 miles apart, with plots every 10 chains, foll ing the general principles of the Finnish survey. find that the cost prohibits spacing the lines clos enough to obtain accurate data for land units as sm as counties, and that by using larger units of a combi natural and economic character, varying from 2,500, to 5,000,000 acres, results of adequate accuracy be obtained with lines 10 miles apart and plots ev 10 chains. These units are of a size and character make the survey data useful and valuable for lo application.

Therefore, as soon as the Tallahatchie gets over inflation the seagoing surveyors will take to the ha woods of northern Mississippi and proceed due e and west across the delta until the kind, extent, volu quality, growth, and depletion of the broad-lea forests are known.

Meanwhile, minor floods in the pine uplands Pearl River County, Miss., are not preventing t crews from completing a similar test in the pine typ When the data from this tryout have been analyz shall be ready to coordinate the hardwood and pine jects so that the crews can work in the pine when the ttomlands are floating barns down the river and in the tomlands whenever the water gets below DBH—ich they *must* measure, and we do not furnish diving ts!

Unless the Mississippi Legislature acts contrary to ecasts there will be very substantial State financial peration with the survey. The South is very much ve in wanting to know what forests can do to keep d working profitably, and so in its interest in the hering of facts about southern forest resources.

Binoculars Help the Lookout Man

The binocular telescope as a tool for the lookout pears to be worth what it costs, according to the ults of tests made under the supervision of the Calinia Forest Experiment Station. Its primary use lies verifying quickly suspicions resulting from observan with the naked eye. It is useful in disclosing the e nature of "false smokes" such as dust clouds and examining recorded strikes after lightning storms. may well be used, also, in periodical close examinans of limited areas where fire risk is high, and may ve valuable in obtaining cross shots on fires from kouts beyond the distance at which the smoke is ible to the naked eye. Use of the binocular makes it ssible, also, to obtain valuable supplementary infortion on the location of a fire, the type in which it is ning, and its proximity to roads or trails.

After trial of several types of telescope sold in this intry, it was decided that a six or seven power prism ocular with a wide field and large objectives was the st desirable instrument for lookout purposes. eater magnification seems undesirable because of the companying greater unsteadiness. A large field of w is a necessity if small objects are to be located ickly and easily; a binocular for lookout use should ve a field of at least 120 yards in 1,000 yards. For a power instrument, an objective aperture of at least millimeters is recommended.

Definition or resolving power is a most important ribute of binoculars in that it controls the ability to tinguish detail. Resolving power may be measured observing through the telescope fine lines so close gether that the lines of sight to them form an angle of m 3 to 10 seconds.

Binoculars with widespread objectives are to be eferred for lookout use, since stereoscopic vision or ief is increased by an increase in the interobjective stance.

Binoculars must be carefully adjusted, or eyestrain ll result. The axes of the instrument should be refully adjusted for all possible interpupillary disnces before they leave the factory, and should be ecked periodically thereafter to make sure that the justment is maintained.

Degeneration of Coppice

By Perkins Coville, United States Forest Service

Foresters who have studied textbooks on silviculture have, as a rule, read and believed that a coppiced stand degenerates after two or three cuttings and must then be revitalized by regeneration as a high forest of seedling origin. This premise tends to lead one naturally to the belief that reproduction by sprouting or even by other vegetative means will result in degeneration of a given growing stock. Horticulturists, on the other hand, are constantly reproducing various plant forms vegetatively with little or no apparent fear of a decrease in plant vigor.

In a coppiced stand reproduction, of course, takes place predominantly or exclusively by sprouts which spring from stumps of trees that have been cut. Frequently these sprouts make exceedingly rapid growth for a few years. The explanation advanced for this rapid growth is that the sprouts have large root systems at their disposal and so can obtain abundant supplies of nutrients and moisture. As the sprouts increase in size, however, decay attacks the stumps from which they have sprung and presumably parts of the root systems as well. It would seem not improbable that this decay, saprophytic though it may be in general, together with infection from materials such as are often left on the ground after logging, has a deleterious effect upon coppiced stands. Prevalence of fire in sprout stands may still further aggravate the situation.

Some stands on the sprout hardwood areas in the Northeast and on charcoal cuttings in Pennsylvania are in such wretched condition as to seem to present positive proof that stands degenerate through coppicing. In the majority of cases these stands show signs of having been subjected to severe and promiscuous cutting in which no thought was given to sanitation or retention of vigorous stock, and appear to have suffered also from fire. Some of them have perhaps been affected by overgrazing. On the other hand there are numerous examples of the sustained vigor of sprout growth. In the Upper Peninsula of Michigan it is common to find large merchantable basswoods obviously of sprout origin. There is evidence that basswoods in many Iowa woodlots have grown vigorously through several sprout generations. The Balm-of-Gilead poplar, so far as can be discovered, occurs only as a pistillate tree; but by vegetative means it has reproduced itself and has spread over a considerable range. The trembling aspen establishes itself in new areas with unbelievable rapidity, although seedlings of aspen are rarely, if ever, discovered. It may be argued that aspen has deteriorated into a weak and short-lived species, but if so it took several millenniums to do this, and not a few short rotations.

At the forest nursery of the Iowa State College there is a group of cottonwoods that are used as a source of cuttings. For more than 15 years these plants have been cut back annually to within 6 inches of the ground. The sprouts are dense and make a height growth of from 6 to 8 feet each year. No one has been able to detect any loss of vigor.

Horticulturists reproduce hundreds of plant species vegetatively to keep them "true to type." Examples are the Bartlett pear, the Delicious apple, the Napoleon cherry, and varieties of sugarcane, bananas, oranges, grapes, and potatoes. To be sure these plants may be reproduced by grafting, budding, inarching, etc., and these methods are not directly comparable to the reproduction of forest stands by coppicing. The main point is that vegetative reproduction does not per se lead to degeneration. It is interesting to recall that all the Lombardy poplars in the world, and all the Balm-of-Gilead poplars, represent clons; in each case all the representatives of the species now in existence have actually been derived, over a long period of time, from one plant.

An incident in which sprout growth revealed innate though hidden vigor recently took place in connection with the propagation of cuttings from some willows on the Arlington farm of the Department of Agriculture. Construction work threatened to annihilate a willow holt on the farm. This holt, which had been planted at a density compatible with annual harvesting of basket willow rods, had received no attention for many years. The willows had grown 25 feet tall. Less than 5 per cent of them remained alive, although all were still standing. A very few had small live tips. From these few tips cuttings of five varieties were obtained, which were planted in greenhouse sand flats. The cuttings rooted and grew prodigiously. In six months the tops had been cut back twice because they were a nuisance. Roots emerged through holes in the flats and spread extensively over the bench. This growth developed from material taken from a stand that, to say the least, was on its last legs.

All this brings us to a question raised by Carl Hartley in connection with pathological conditions in coppiced stands: Do sprout species degenerate from coppicing, as we have been told, or do they retain their inherent vigor and appear degenerate only because of the influences of fungal infection, disintegration of the parent root, and deterioration of the site? Doctor Hartley and I believe that if cuttings from sprouts of the fifth or sixth sprout generation were rooted, even though the sprouts were apparently in poor condition, the cuttings would show vigorous growth remarkably similar to that of cuttings from young seedlings grown near by. If some one can demonstrate that stem cuttings, root cuttings, or layers taken from coppice in a so-called degenerate stand and others taken from seedlings will grow equally well under conditions comparable as to sanitation, foresters will perhaps be persuaded that degeneration is due to external and not inh factors. It may then be possible to discover and bat the external factors, so that sprout hardw will grow in a healthy manner. The millen for the sprout hardwood region will then have arr

NOTE.—Doctor Hartley comments on Mr. Coville's paper as fc "I doubt if decay does harm to sprout growth when it attacks dead rial only. Fortunately the fungi that usually develop on logging are species that rarely attack living trees. Fungi that are semipa undoubtedly destroy parts of the old root systems that otherwise have lived, and I should expect that in some cases fungi that had oped on the dying parts of the root systems of felled trees would s into healthy roots. Heart-rotting fungi sometimes spread from th stumps into the butts of the sprouts that arise from them, but it impression that this is common enough to produce serious decay i protected stands in relatively few species, and only on poor sites or repeated generations of coppice. We know too little on this point Mr. Jackson has undertaken to investigate it at the Allegheny F Experiment Station."

Indiana Locusts Are 88 Feet Tall

The tallest stands of locust that the Central St Forest Experiment Station has found in its terri occur in Jefferson County, Ind. A 40-year-old st at Paris, Ind., is 88 feet tall. In this stand diame run as high as 13 inches, and one outside tree is ab 20 inches in diameter at breast height. The maxin height is 94 feet. The planting was established locally procured sprouts. Another excellent sta planted on limestone soils southwest of Dupont, risen in 31 years to about 75 feet and has diameter great as 15 inches. Evidence of early attack by lo borers appears in both of these stands. This is accordance with observations in Ohio, which indi that the very best plantings are not immune to borer in their youth but that on good sites the t recover and grow thriftily in spite of the insect dam

* * *

The Bessey nursery, on the Nebraska Natio Forest, at Halsey, Nebr., had 800 visitors on Septem 26, when the annual picnic was held. Not only the guests given an explanatory tour through the n sery and through the plantations that have b established with its output of many successive ye but on visiting the new packing and storage shed t found packages of 2–2 Scotch pine prepared for th wishing to cooperate in an experiment in fall plant The 300 recipients of trees left their signatures received forms on which to report the results of th fall planting to Extension Forester Watkins.

* * *

A leaf of bigleaf maple (*Acer macrophyllum*) collec by Ranger John E. Gribble on the Siuslaw Natio Forest, Oreg., measures 18$^{11}/_{16}$ inches in width.

Fire Prevention Gains in the North

By L. C. Pratt, United States Forest Service

fter a quarter century, the fire-prevention mission-
of Alaska seems to have reached the happy state of
ing overcome the most disheartening of all his
tacles—public indifference.

everal factors peculiar to Alaska have retarded
advance of fire prevention: First, the tremendous
of the Territory—600,000 square miles, with an
eme north and south distance of 1,300 miles and
east and west distance of 2,300 miles; second, lack of
quate transportation and communication facilities;
d, sparsity of population—1 human being to each
square miles of territory; fourth, the insect pest,
n which at least temporary relief may be obtained
urning off the ground cover; and fifth, the ease with
ch ground may be stripped of vegetation by burning
n aid to mining.

s to the first of these factors, by no means all of
vast territory is timbered. The coastal region,
its countless islands and picturesquely irregular
e line, is more or less heavily timbered from Dixon
ance on the southeast to Kodiak Island in the west,
ghly a distance of 1,400 miles. Here, however, the
cipitation is heavy and the fire problem is not acute.
the great interior river valleys south of the Arctic
cle contain timber, and in this region precipitation
rages about 10 inches a year. Here, during the
rt but intense summers, the ground cover ignites
ly and fires spread rapidly.

he Alaskan prospector and miner of an earlier day
timber mainly as a hindrance to his burrowing for
l or as a breeding place for swarms of vicious insects.
natural inclination was to remove this obstacle in
shortest and easiest way—by burning. Lightning
t no aid, so he did it with his own lily-white hands.
us when the forester followed the prospector to
ska he found little difficulty in locating the trails.
t he didn't like that particular kind of trail. He
an at once, and vigorously, to protest.

nly two national forests were set aside in Alaska,
both of them in the coastal belt. The Chugach,
vever, included the Kenai Peninsula, where fire
ger was great. This offered the forester an oppor-
ity to make a practical demonstation of the value
fire prevention. Here for the past 25 years he has
n demonstrating what can be done. Not only
he kept national forest burned areas down to a
ditable acreage—for 1930 the total was 421—but in
fire organization he has trained many Alaskans,
ng and old, in modern methods of fire prevention and
pression. Such men, honest converts to the cause,
e scattered to all parts of the Territory. They
stitute an active nonpaid missionary corps, and their
uence is being felt to a greater degree every year.

A second important factor in the spread of the fire-prevention gospel is the interdepartmental cooperation that is developing as a result of the work of Charles H. Flory, regional forester and commissioner for the Department of Agriculture in Alaska.

A practical cooperative scheme is in effect between Federal agencies and the Alaska Railroad, which traverses 500 miles of partly timbered country. As a result of this plan every section crew, every trainman, and in fact every employee on the line now regards with vast concern any fire along the railroad. Active measures are taken by railroad employees to prevent fires and, when fires occur, to suppress them promptly.

The Department of the Interior, through Chief of Field Division J. A. Ramsey, maintains a small patrol force along the railroad and some of the highways. As more funds become available it is expected that these forces will gradually be expanded.

The Biological Survey and the Alaska Game Commission are effectively lending a hand. They have carried on a campaign of education showing the effect of forest fires on the supply of game and fur bearers.

The work is well begun, and it is music to the ears of the forester to hear an old prospector, miner, or trapper remark "Say, feller, some son of a gun started a fire up on Esther Creek yesterday, but we got 'er out before she spread much. Wish you fellers would put a patrolman in this section. If we don't keep fires out of here the game and fur'll all be gone in a few years more."

It's a sweet song, and the chorus is swelling.

* * *

The purchase of 82,575 acres of land in 15 different States for national-forest purposes, at an expense of $204,116, was approved by the National Forest Reservation Commission on December 14, 1931. This purchase program covers 10,875 acres within the Moquah purchase unit, in Wisconsin; 9,531 acres within the Hiawatha National Forest, Mich.; 8,117 acres within the Ouachita National Forest, Ark.; 7,592 acres within the Unaka National Forest, Va. and Tenn.; 7,533 acres within the Superior National Forest, Minn.; and 5,007 acres within the Kiamichi purchase unit, in Oklahoma.

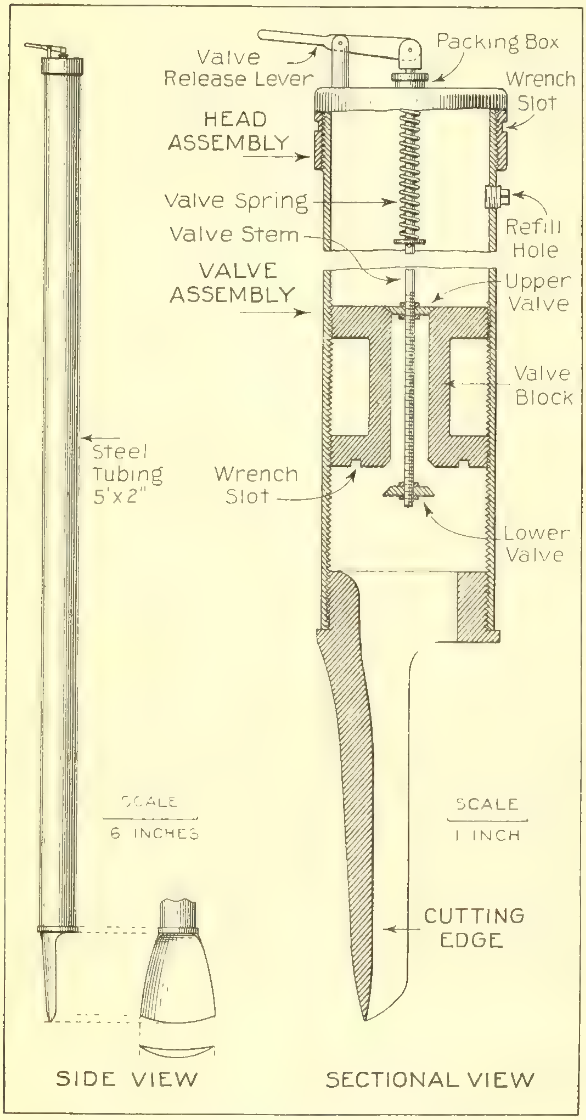
* * *

The name "ponderosa pine" has been adopted by the Forest Service in substitution for "western yellow pine" as the common name for *Pinus ponderosa* and "Jeffrey pine" as the common name for *Pinus jeffreyi*. The new name has the approval of the Western Pine Association and will be used in marketing lumber manufactured by the members of the association from these species. It has an advantage over "western yellow pine" in that it is a binomial.

A Tool for Poisoning Trees

By A. L. MacKinney, United States Forest Service

The practice of poisoning undesirable trees in order to improve the composition of forest stands of relatively thin-barked species has gained in practicability through the development of a tool that makes tree poisoning a one-man job. When two men were required, one to make incisions in the tree trunks and another to introduce the poison, labor costs were excessive. The tool that enables one man to do both the cutting and the "dosing" was devised by Joshua A. Cope and J. Nelson Spaeth, of Cornell University. Using their idea, I have designed and made a tool embodying several modifications of the one originally described by Cope and Spaeth in the Journal of Forestry, May, 1931.



The modified tool, sectional and side views of w are shown in the accompanying drawing, consists 5-foot length of 2-inch seamless steel boiler tub fitted with a series of valves set above a cutting e at its lower end and a 4.8-foot wire running through tubing connecting the valves with a release lever on the upper end. The 4.6 feet of barrel above valves forms a reservoir with a capacity of 3 quarts

The cutting edge was made by working one end solid block of tool steel into a blade 5 inches wi curved to approximate an arc of a circle with a 1-f radius. The blade tapers into a block 2.5 inches diameter, which is threaded to screw into the lower of the tube. Below the threads is a flange to prev screwing the blade in too far. Within the bloc hole 1.6 inches in diameter serves as a runway for poison solution from the valves to the surface of blade.

The valve block was made from a solid cylinder brass 2.25 inches in diameter and 2 inches long. exterior was threaded to screw into the barrel. Thro the center of the block a hole was cut 0.5 inch in dia ter, the upper and lower rims of which were beveled provide seats for the valves. The exterior was rean out so as to leave a 0.25-inch wall around the cent portion of the cavity and threaded flanges around top and bottom. Two shallow holes for wrench sl were made in the bottom of the block. The fi position of the valve block is 2.5 inches above the lo end of the barrel.

The wire by means of which the valves are operat is three-sixteenths inch in diameter. The valves of brass and are screwed onto the wire in such a p tion that when the upper valve is seated the lower 0.25 inch below the valve block. The lever used raise and depress the wire is set in a brass head at t top of the barrel. The wire is held down by a c spring inside the head except when it is raised by depression of the lever.

The poison solution is introduced into the bar through a small hole just below the head. This h is sealed with a threaded plug.

In using this tool not much force is required to dri the cutting edge about one-half inch into the sapwo With a downward thrust of the tool, an incision is ma as close to the base of the tree as possible. The cut pried open by pulling back the upper end of the to A motion depressing and releasing the valve-relea lever immediately liberates a measured quantity of t poison into the wound. This treatment is repeat until a continuous row of incisions encircles the trun

A set of nested hollow brass cylinders that fit ov the wire inside the valve block can be used to cont the quantity of solution liberated.

The complete tool weighs approximately 16 poun empty. Filled to its total capacity of 3 quarts, weighs 22.25 pounds. If one teaspoonful of soluti is liberated into each incision one filling of the to ffices to treat approximately 125 trees 6 inches in ameter.

L. I. Barrett used this tool to poison 150 trees in rth Georgia. In this work it was found that a wire ached to the valve release lever and fitting around e operator's hand made possible a material increase speed of operation.

It is planned to make a new tool on this model in ich aluminum alloy will be substituted for steel and ass. This will reduce the weight of the tool by nost one-half and thus make it much more usable silvicultural improvement work.

ample Plot Technique for the Southern Appalachians

In establishing new sample plots on the Bent Creek perimental Forest this winter the Appalachian For- Experiment Station used a cross of white paint to rk breast height on each tagged tree. Tags were iled a foot above breast height, so that the swelling en produced about nails driven into hardwood es will not distort later diameter measurements.

In mapping the stems of trees, and also in charting e shade of rhododendron and laurel clumps, use was ide of a network of strings one-half chain apart ch way. A chain tape was stretched through the nter of each half-chain square and the position of ch tree in relation to this line was determined by e use of a long measuring stick. To make contour ps, elevations were read at all corners of the squares th an Abney level.

An advantage of winter over summer as the season establishing sample plots in the southern Appala- ians is the fact that less time is required for plot rveying and stem mapping when the leaves are wn. Disadvantages are the difficulty of finding afless reproduction and the danger that work will be terrupted by bad weather. In this instance, with ur experienced men working in pairs, the time quired to establish four half-acre sample plots was follows:

	Man days
rveying, including temporary location and final survey	8½
agging and describing 774 trees	9½
apping tree stems and rhododendron and laurel shade	8½
opographic maps	4
ainting breast-height points on 71 trees to be left, painting boundaries, witness trees, etc	3½

* * *

Forest Service motion-picture films sold during the ar ending with November, 1931, totaled 75, includ- g 22 of 16-millimeter width and 53 of the standard -millimeter width. The purchasers were chiefly ate foresters, colleges, and schools.

Erosion Studies in Mississippi Include Contour Mapping

By G. H. Lentz, United States Forest Service

In order to get more definite data as to the bearing of erosion on the utilization of farm areas in the silt loam uplands of Mississippi, the Southern Forest Experiment Station has prepared topographic maps for five representative farms in three counties in the north-central portion of the State. A contour interval of 5 feet was used, with a horizontal scale of 2½ chains to the inch.

The work was carried on with a traverse board, compass, topographic Abney level, and 2-chain slope tape. On badly dissected areas strip lines were run at intervals of not more than 5 chains; where the topography was fairly level, the distance between lines was as great as 8 chains.

Cover type boundaries were indicated by dashed lines, and all areas in gullies or breaks or where the mineral soil was exposed by sheet erosion and gully formation were carefully mapped in. Thus the field map showed in addition to the contours the cultivated areas, pasture land, woodland, abandoned land, and areas actively eroding.

In the office, tracings were made so that blue line prints could be obtained. The acreage included in the various cover types was determined with a planimeter. The total area mapped was calculated and a percentage figure obtained for each class of land.

Even though contour lines can hardly portray the grotesque formations caused by erosion, the maps show very clearly what has taken place. In most cases no erosion has occurred under forest cover, even where tree growth only partially covers the soil and where fires have occurred almost annually.

Colors Mean Numbers on Rods for Charting Brush

In charting dense brush vegetation on run-off and erosion plots the California Forest Experiment Station makes use of wooden rods 10 feet long by 1 inch square. These rods are marked off in feet and painted in bright colors like surveyors' sight rods but with the difference that five instead of two different colors are used, each 5 feet of rod displaying the same sequence of white, orange, blue, yellow, and red. Two such colored rods are thrust through the brush across the plot on the contours and 5 feet apart. Instead of having to look for numbers or letters to identify the foot distance of a plant from either side line the cartographer has only to distinguish the identifying color of the foot in question, and this he can do if only an inch of the color shows through the tangle of vegetation. The location between contour rods is determined by means of a graduated 5-foot rod carried in the hand.

Central States Tests Prove Porosity of Forest Soils

A study carried out during the summer of 1931 by John T. Auten on 36 second-growth forest sites and adjacent field sites in the Central States brought out evidence that the soil of forest areas does not lose its porosity after the timber is cut if grazing use is closely restricted. By determining the specific gravity of soil on plantation and corresponding field areas Doctor Auten found that when forest plantations are established on old fields the soil regains its porosity in from 20 to 25 years. The surface 9 inches of soil was found to be approximately 15 per cent heavier in grazed woods than in ungrazed woods. Virgin forest soil at a depth of 1 inch was found to absorb more than 46 times as much water per minute as soil at the same depth in adjacent fields. The quantities of water absorbed per minute by virgin forest soil at the 3-inch and 8-inch horizons were more than 14 times and more than 2 times, respectively, as great as the quantities absorbed by the field soil at those horizons.

Hunters Again Reduce Kaibab Deer Herd

Hunters entering the Kaibab National Forest, Ariz., during the 30-day deer-hunting season of 1931, which began on October 16, carried away with them 879 deer. State licenses permitting the holders to shoot one deer each were issued to 980 hunters, of whom 771 were residents of Arizona and 157 were from California. The plan agreed upon by the United States Forest Service and the Arizona Game and Fish Commission required that every hunter report at a central checking station and be assigned to a hunting camp, and that he return to this camp each night. Hunting of does as well as of bucks was permitted. When a deer that was very poor, badly shot up, or apparently diseased was brought to camp it was condemned and the hunter was given permission to shoot another. Deer condemned in this way numbered 41, and 45 dead deer were found on the range that were believed to have been killed by hunters. No hunting accidents were reported.

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A growth study covering the 180 acres of woodland on the Georgia Mountain Experiment Station, at Blairsville, Ga., believed to be typical of the timber lots which form a large proportion of the valley farms in north Georgia, has been completed by the Appalachian Forest Experiment Station. The maximum growth per acre per year, that of the hickory-chestnut oak type, is 0.45 cord (of 90 cubic feet); the lowest, that of the white oak-black oak-chestnut oak type, is 0.28 cord. There is present on the tract an average of 0.5 cord per acre of dead wood usable for fuel.

What's in a Name?

By Oscar Evans, United States Forest Service

If you travel up and down the Sierra and C Range, or wander within the national forests of C fornia, you are struck by the frequency with w certain place names bob up. Time and again you c upon a Mill Creek, a Bear Creek, a Willow Creek, Cottonwood Creek. You notice also that the cre often bear good old Anglo-Saxon surnames or na of commonplace objects that the early pioneer h pened to spy. If John Jones pitched his camp o stream it was forthwith called Jones Creek. If later saw a dead cow on a stream you may be sur was called Dead Cow Creek—no imagination th In contrast, the good padres who named many of topographic features in southern California gave th the names of cherished saints or of human qualit such as Merced, River of Mercy, or Modesto—mod The padre, more often than not, named natural f tures after things that were in his thoughts; trapper, prospector, or stockman, after things that saw. The Spanish penetration from Mexico i California began about the time of our Declaration Independence, and its course was primarily along coast and into the larger valleys. It never spread beyond the line of missions extending from San Di northerly to the San Francisco Bay region. T Anglo-Saxon came overland. Only an occasio American scout or trapper climbed the weary t over the Sierra summit previous to the first immigr train in 1841. Between this mere trickle and flood of goldseekers that came in '49, a simple a elemental naming impulse prevailed in the mounta of California. A review of the names borne by tional-forest creeks alone tells the story.

Surnames, of course, outnumber all others, total 270. Distinctly English names come with ra regularity, 240 of them. There are 12 Scotch and Irish; the others include German, Scandinavi Dutch, Spanish, French, and Hawaiian. Eight Pre dents are commemorated.

The most common name of all is Mill, which occ even unto 29 times. The presence of a mill apparen was a striking fact in those early days. Next come Bear Creeks, 27 of them, with 10 Grizzlys in additio not to forget several occurrences of Oso (Spanish bear). Evidently the old-timers sat up and to notice when a bear was around. Willow claims th place, with a count of 19, and there are 17 Cottonwo Creeks. Those two stream-loving species meant wat and water meant camp. The next six things that me impressed themselves on the minds of the pione were Rock, 16 times—plenty of granite in the Sier Deer, 15—their main source of food; Rattlesnake, 11 one of their fears; Cold, 11; Indian, 11; and Bould 10. The old-timers had drunk the cold Sierra wa that came splashing down over the granite bowld

had hunted for deer, keeping their eyes open the
e for rattlesnakes and Indians.

rees, shrubs, animals, birds, reptiles, insects, colors,
sehold articles, tools, and features of the earth's
ace all contributed to the naming of these beau-
California mountain streams. Thirty species of
s are represented. After Cottonwood and Willow
e Cedar, which appears 10 times; Alder, Ash, and
keye, 5 times each; Pine, 4 times; Maple, Syca-
e, and Laurel, 3 times each. Not so many shrubs
plants were honored—in all, only 12 species:
wberry (4 times), Huckleberry (4), Onion (3), and
kberry, Thimbleberry, Grapevine, Peavine, Pars-
Clover, etc. The berries were the most popular—
old-timer was looking for food. Four times he did
take the trouble to pick out a species, but just
"Brush." Twenty kinds of animals are repre-
ed. The more common after Bear and Deer are
se (7 times), Cow (6 times), Mule, Panther, Coon,
Antelope (4 each), and Dog, Wolf, Sheep, Bull
(3 each). Inhabitants of the water lent their
es as follows: Trout, 7; Salmon, 4; and just
sh," 5. There are five representatives of the in-
family: The lowly louse, the droning bumblebee,
fiery yellow-jacket, the pestiferous mosquito, and
industrious ant. Of the 10 species of birds that
a part in the national forest creek nomenclature
use is the most common, with a score of 6—food
n. Eagle Creek occurs 4 times and one finds also
tridge, Wren, Sagehen, Goose, Crow, and Owl
eks. The antagonistic rattlesnake leads all the
iles, but there are also Scorpion, Tadpole, and
ke Creeks. Of the metals Silver leads with 5,
wed by Galena, Iron, Copper, and Gold. The
rs are Green, Yellow, Blue, Gray, Brown, and
colate, with 4 Blues leading.

he traveler in the mountains will encounter a
ber of creeks named for European and Asiatic
tries and nationalities—Ireland, Wales, Spanish,
ch, Italian, Portuguese, Dutch, Frenchman,
chman, Dutchman, China, Russia, and Siberia.
good measure we have American and Canadian
eks. Physical factors of the earth gave names to
reeks. Following Rock, Cold, and Boulder there
5 repetitions each of Mud, Fall, Big, and Swamp,
Sand, and 3 of Slate, and also Slide, Meadow,
y, Bluff, and many others as casual.

23 instances the old-timer betrayed the limita-
s of his vocabulary by giving our sparkling, foaming
ra streams such commonplace names as Shovel,
p, Frying Pan, and Pick. Shades of the padre!
would at least have made it "Creek of the Stout
." Sometimes odd or trite names crept in such as
-Eye, Tish-tang-a-tang, Whiskey, Moonshine, Pig-
Texas-chow, Shoofly, and Fiddle. Indian names
r less frequently than one would expect; we find
witz (deer), Eltapom (high valley), and others.
an occasional creek name commemorates some
oric incident. Lost Cannon Creek is a reminder that
Fremont was forced to leave his cannon behind during one of his path-finding expeditions.

What's in a name? Everything! The whole life of the California pioneer is revealed—his previous history, his daily life, his primitive surroundings, his haunting fears. What's in a name? Say "Clear Creek" to some denizen of the pavement and four walls, and immediately his mind is filled with the romance of a Sierra camp—a purring stream, shimmering lakes, sparkling air, the pungent fragrance of fir and pine, shady trails, light sifting down through a leafy canopy, and quiet carefree days.

Forest Service Dramatic Sketches Go On the Air

A radio dramatic program depicting the life and work of forest rangers on the national forests is to be heard hereafter during the National Broadcasting Co.'s national farm and home hour and western farm and home hour. This program, entitled "Uncle Sam's Forest Rangers," replaces lectures on Forest Service work that have heretofore been given. The stories are woven around two main characters—Ranger Jim Robbins and his newly appointed assistant, Jerry Quick. Harvey Hays has been assigned to the rôle of Jim Robbins, and Arthur Jacobson to that of Jerry. Clifford Soubier plays the forest supervisor and Judith Lowry is Bess Robbins, the ranger's wife. Beginning January 7 the broadcasts will be made every Thursday from the Chicago studios of the National Broadcasting Co. during the national farm and home hour, which begins at 12 noon central standard time. Beginning February 1 they will be made also from the company's San Francisco studios during the western farm and home hour, which begins at 12.15 p. m., Pacific time, on Mondays.

Improvement Operation Covers 9,000 Acres of the Ouachita

Operations to improve growth conditions for shortleaf pine were carried out during the winter of 1930–31 on seven timber-sale areas on the Ouachita National Forest, Ark. The areas treated, all of which were in the better site classes, totaled approximately 9,000 acres.

The improvement work consisted of cutting small hardwoods of poor form and weed species, girdling unmerchantable hardwood wolf trees, and thinning dense patches of advance growth of pine 15 to 30 years of age. Hardwood trees were cut or girdled only if competing with, crowding, or overtopping pine. Trees were girdled by a continuous line of downward hacks through the outer and inner bark well into the sapwood.

At the end of the following summer most of the girdled trees of the narrow-sapped species such as black oak and red oak were dead. Some of the girdled trees will undoubtedly survive for a few years. According to observations of H. E. Ochsner, in charge of the operation, the order in which the various species succumb is approximately as follows: Blackjack black oak, red oak, post oak, white oak, hickory, black gum, and red gum.

General Forest News

A New Type of Forest-Fire Pumper

At the request of N. C. Sparks of the Canadian Department of the Interior, two mechanical engineers of New Hampshire have designed an engine and pump that have all the appearance of being what forest-fire fighters are looking for in the way of power equipment, writes District Forest Inspector C. R. Tillotson. The two engineers are Ralph L. Morgan, of Richmond, and Arthur A. Cushman, of Keene. Mr. Sparks specified that the pump should be of the displacement type and capable of delivering 66 United States gallons per minute at 200 pounds pump pressure. The engine was to be four cycle. The whole outfit was not to weigh more than 125 pounds, and was to be so constructed that it could be easily separated into two units and just as easily reassembled. Mr. Morgan and Mr. Cushman have many years of mechanical engineering experience behind them. After about a year of intensive effort it seems that they have designed an outfit which will meet the specifications. The engine itself is something entirely new in motor design. The pump, while of the rotor type, is of a new and especially effective design. Money has been raised to manufacture these outfits, and it is believed that they can be produced in quantity by next summer or fall.

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The list of States in which white pine blister rust infection is known to be present was enlarged in 1931 by the addition of Maryland, Virginia, West Virginia, Ohio, and Iowa. The area in the East previously known to contain the infection consisted of the Lake States, the New England States, New York, Pennsylvania, and New Jersey. The spread of the infection to the western part of Michigan was discovered in 1931 for the first time.

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"Some coast lumberjacks demonstrated to me a new method of carrying falling saws," writes Clyde D. Blake, assistant supervisor of the Nezperce National Forest, Idaho. "They placed the handles on the saw, then bent the saw into a circle, hooked and tied the handles together, then holding the handles they placed the saw on the shoulder (teeth out, of course). A saw bent in this shape can be carried through brush without hooking every bush or twig within 50 yards' distance and can be carried for long distances without the never-ending up and down flop."

Land Use Conference Makes Constr tive Recommendations

By W. N. Sparhawk, United States Forest Service

Approximately 375 persons, representing all sect of the country, were registered at the National Cor ence on Land Utilization which was held in Chic November 19–21. The conference was called by Secretary of Agriculture and the executive commi of the Association of Land Grant Colleges and Uni sities for the purpose of discussing the land-utiliza problem and formulating recommendations for Fed and State action. Secretary Hyde delivered an add at the opening session and presided at the conclu session. The topics discussed included utilizatio western range land, methods of taking submarg land out of agriculture and preventing further exp sion of agriculture on poor land, forest policy, l acquisition by the public, taxation in relation to a culture and forestry, soil erosion, adjustment of farm organization and methods in the better areas, and a cultural credits.

Among other things the conference recommen that the western grazing lands be organized public ranges and administered in close coord tion with the national forests; that lands va ble for the protection of watersheds be administe under the supervision of the Federal Governme that only the land that is clearly supermarginal agriculture be eliminated under the homestead l and that the remainder be withdrawn from entry added to the public reserves; that reclamation eff be confined to projects already started; that Fed and State agencies develop coordinated programs for use of submarginal land by removing the econo obstacles to private ownership and providing for pu acquisition of land that private owners will not l and manage in accordance with the public inter and that the Federal Government assist the State carrying out land economic surveys and classificat

For the purpose of developing a national program creation of a national land-use planning commissio 15 members was recommended, to consist of represe tives of the Department of Agriculture, the Dep ment of the Interior, the Federal Farm Board, the F eral Farm Loan Board, and the land-grant colle It is proposed that in formulating plans and furthe their adoption this commission be assisted by a natic advisory and legislative committee on land use to made up of representatives of the farm organizati ultural editors' association, United States Chamber Commerce, American Bankers Association, State missioners of Agriculture, American Forestry ciation, livestock associations, and railroads.

Vindbreaks Effective Against Desert Winds of Southern California

By Floyd D. Young, United States Weather Bureau
(From Monthly Weather Review, October, 1931)

llowing the damaging desert winds in southern ornia in the fall of 1924, a study of the effect of lbreaks on the wind velocity and relative humidity undertaken by the fruit-frost service of the ther Bureau in cooperation with the Villa Park ards Association and the Orange County Fruit ange. Records of wind velocity, relative humid- and temperature were obtained at two stations citrus district subject to desert winds, one in an without windbreaks and the other at varying nces behind a windbreak about a mile to the west- l in the same general location. The windbreak 1,280 feet long and extended north and south. roximately one-half its length was made up of lyptus (blue gum) trees, about 95 feet high, and half Monterey cypress, about 70 feet high. The break trees were 30 years old. The orange trees, 24 feet apart on the square, were 28 years old. nometers at both stations were placed 18 feet above ground, or about 2 feet above the tops of the trees. mometers and hydrographs were exposed in fruit- n instrument shelters in the orange groves, 4.5 above the ground. The windbreak station was 65 feet to the leeward of the windbreak the first n, 310 feet the second season, and 500 feet the l season. Wind velocities in the open (check on) and behind the windbreak during the progress sert winds are shown in the following table.

	Average hourly wind velocity [1]	Average hourly maximum velocity (5 minutes)[1]	Maximum velocity period of wind [1]
18, 1925:			
neck station	12.0	15.0	27.0
5 feet behind windbreak	5.5	6.5	15.0
ecrease due to windbreak per cent	54	57	44
–10, 1926:			
neck station	18.0	22.0	29.0
0 feet behind windbreak	8.0	9.0	13.0
ecrease due to windbreak per cent	56	59	55
–4, 1927:			
neck station	23.1	27.6	38.0
0 feet behind windbreak	17.3	20.3	27.0
ecrease due to windbreak per cent	25	26	29
7–18, 1927:			
neck station	20.4	25.7	34.0
0 feet behind windbreak	14.8	18.1	28.0
ecrease due to windbreak per cent	27	30	18

up anemometers used.

The records indicate that the effectiveness of the windbreak is as great at 310 feet as at 165 feet, and that its effectiveness decreases by approximately 50 per cent at a distance of 500 feet. The openings between the trunks of the windbreak trees were large enough near the ground to permit considerable air movement through them, while higher up the heavy foliage of adjoining trees was interlaced, leaving few open spaces. It is believed that the wind entering the orchard near the ground increased the velocities shown at the 165-foot station and accounted for the lack of difference between the velocities at 165 feet and 310 feet. This breeze coming in between the tree trunks very close to the ground undoubtedly was spread and dissipated to a large extent by the resistance of the orange trees before it had traveled far into the orchard.

A careful inspection of the two orange groves in which the windbreak studies were carried on was made immediately after the desert winds of December, 1927. * * *

In the orchard protected by the windbreak no fruit was blown off the trees for a distance of 288 feet. From this point to the 500-foot line fruits on the ground averaged four to the tree. From 500 feet to the western border of the orchard, 784 feet from the windbreak, the number of fruits per tree on the ground increased rapidly. A count of oranges under 10 trees in the last row showed an average of 30 per tree.

The number of oranges per tree on the ground in the check orchard varied from 98 to 452, with an average for all parts of the grove of 163.

The relative humidity was always somewhat higher behind the windbreak during relatively light desert winds, but there was little difference between the two stations during the heaviest winds.

These studies indicate that a windbreak such as the one for the orchard in which the records were obtained affords practically complete protection from desert winds, both as to loss of fruit and damage to foliage, up to a distance of about 500 feet, and partial protection up to at least 800 feet from the break. Data on wind damage show the necessity for an adequate system of windbreaks throughout the sections visited most frequently by desert winds. The disastrous effects of desert winds in 1924 and 1927 resulted in the planting of many miles of new windbreaks in portions of Orange County, but lack of severe winds in recent years ha resulted in many of them being removed. Large windbreak trees compete for food and moisture with citrus trees in adjoining rows, and cause some reduction in the crop of fruit. Also the planting of windbreaks throughout a large area increases the frost hazard to some extent. However, the protection from desert wind damage far outweighs either of these factors in the districts most subject to wind damage.

Many different types of windbreaks have been devised in addition to the familiar lines of growing trees. Artificial windbreaks erected in an orange grove near El Modena, Calif., are placed in every fourth tree row north and south, or about 96 feet apart. They extend to a height of about 23 feet and are anchored firmly to heavy stakes driven into the ground. Their cost, when constructed with second-hand lumber, was slightly more than 75 cents per running foot.

Studies to determine the effectiveness of these windbreaks were carried on during the winter of 1930–31. Unfortunately the wind direction at the chosen location was subject to change from north to east, or vice versa, during the progress of desert winds, so that the wind direction was sometimes parallel to the windbreaks. When the wind was in the east its velocity midway between two breaks was reduced by approximately 50 per cent, but when the wind direction changed to north, the velocity was sometimes stronger between the breaks than at the check station. The windbreak structures withstood velocities as high as 20 miles per hour without any indication of weakness.

* * *

Examining needles of Monterey pine (*Pinus radiata* D. Don) growing on the grounds of the coastal laboratory of the Carnegie Institute of Washington, at Carmel, Calif., in 1930, Ferdinand W. Haasis found them occurring not uncommonly in fascicles of four instead of the usual three or occasional two. Four-leaved fascicles were found on nine different trees, on the growth of the years 1925, 1927, 1929, and 1930. The greater number of the 4-leaved clusters noted were on the main stem. Such clusters were found both on vigorously growing trees and on overtopped trees. A few 5-leaved clusters were seen.

* * *

The Migratory Bird Conservation Commission, of which Secretary of Agriculture Hyde is chairman, on December 3 authorized acquisition by the Bureau of Biological Survey of 10 areas for migratory game bird refuges in New York, Maryland, North Carolina, South Carolina, Florida, Nebraska, North Dakota, Wyoming, and Nevada. The total area is 43,227 acres and the cost to the Government will average $5.74 an acre.

* * *

A forestry committee is one of the 10 major committees through which the Southeastern Economic Council, organized at a meeting held in Savannah, Ga., October 19–21, 1931, plans to study and endeavor to ameliorate economic, industrial, and social conditions in individual States of the Southeast. One hundred or more representatives of economic, civic, and social organizations, industries, public agencies, educational institutions, etc., in eight States took part in the organizing of this council. Each committee is to have two members from each of the member States.

A New Psychrometric Whirling Ap ratus

To facilitate fire weather survey work Lesli Gray, of the San Francisco office of the United S Weather Bureau, has designed a new apparatu whirling the standard Weather Bureau hand psychrometer within the usual cotton region o operative observer's type of instrument shelter. Gray describes the apparatus as follows:

> The whirler consists of a simple pipe support w flange at the bottom and a T at the top. The fl is bolted to the floor of the instrument shelter, the being reinforced by a short strip of 1 by 4 inch lun The T is fitted with solid brass plugs at each through which holes are drilled to form bearings f small crank shaft. A combined clamp and cou balance, to hold the psychrometer, is fitted to one of the shaft, and the other is bent in the form crank handle, to which is fitted a rotating sleeve convenience in turning the crank. The drop of crank handle is such as to permit of readily achie the standard ventilation for the wet bulb thermom that is, a travel of the wet bulb of approximatel linear feet per second. The psychrometer is fitte the clamp without alteration other than the remov the chain links and handle, the hole in the alumi psychrometer back fitting on the end of the crank s and the back fitting a machined channel in the cla The psychrometer is held securely in the clamp b small rectangular plate and wing nut threaded on end of the shaft. The psychrometer hangs in clamp in such a position that readings of the therm eters and wetting of the wet bulb covering may readily accomplished. Suitable oil holes are prov at main bearing points. The psychrometer may whirled in the shelter without interfering with m mum and minimum thermometers, Townsend pat thermometer support, or hygrothermograph. Op tion of the whirler is simple, involving only the turn of a crank, in contrast to the knack or skill require whirl the hand sling psychrometer without damag the instrument.
>
> It is expected that the new whirler will have sev advantages:
>
> (1) The cost is about one-third of that of the gea apparatus now in use; the present apparatus is too large for cotton region shelters.
>
> (2) It utilizes standard hand sling psychrome without alteration.
>
> (3) It secures a fixed exposure for humidity meas ments, eliminating the effects of varying local expos such as occur when observations are made with shelters, it makes possible direct checks on recorc instruments exposed in the same shelter, and it ma fire weather observations more strictly compar with those made in shelters at regular Weather Bur stations.
>
> (4) It provides a feasible apparatus for secu humidity observations from cooperative climatolog stations, with but little additional cost.
>
> (5) Its construction is very simple, long wear and requires little care. It has no gears, making smooth and easy action without vibration which mi cause the minimum thermometer index to be jar from its correct position.
>
> (6) It requires very little operating skill, turning stopping a crank being all that is necessary.
>
> (7) It eliminates a large part of the breakage thermometers commonly experienced, because of

ple operation of the instrument and the sheltered tion of the thermometers.

working model of this instrument is on display for ection by those interested. A limited supply of ruction sheets and specifications are available for to those wishing to construct instruments of this , and will be furnished on request to the writer.

◆

he root nodules that occur on all cultivated and t wild legumes, constituting the laboratories in ch bacteria gather free nitrogen and transform it compounds capable of being assimilated by the plant, apparently do not occur on the roots of the species honeylocust, coffee tree, redbud, and carob, and certain other plants, so far as information is available to the Department of Agriculture. Nonleguminous species that produce root nodules very similar to those of legumes include the alder.

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The Paper Makers Chemical Corporation, of Kalamazoo, Mich., has become affiliated with the Hercules Powder Co., of Wilmington, Del., the Naval Stores Review reports. It will continue to operate under its own name, as will its subsidiaries. This corporation obtains all its raw material from the Suwannee Forest, at Fargo, Ga., of which I. F. Eldredge is manager.

Foreign Notes

The Danish Beech Forests [2]

By C. H. **Ostenfeld**, University of Copenhagen, Denmark

here is not much forest-clad land in Denmark— more than about 8 per cent of the surface can be sidered as covered by forests. Of this forest area ut one-third is beech forest, while most of the ainder is coniferous forest, mainly spruce. All the iferous forest is artificial and has been planted ing the last two centuries. Only two coniferous nts (Juniperus and Taxus) are spontaneous in mark and neither is forest forming: the juniper ather common in Jylland and northeast Sjælland; yew has been found wild in one place only, in thern Jylland.

mong the deciduous trees the beech is the com- nest. Nearly all deciduous forests in Denmark beech forests. Nowadays the beech forest is ost pure; in earlier times, before it was so much uenced by man, the deciduous forest consisted of ch, oak, ash, alder, elm, etc. The last tree to immi- e was the beech. Its victory over the other trees f very recent date and is due partly to man, partly he deep shade in a beech forest preventing other s from growing. Man's influence consisted mainly he fact that owing to the higher value of the oak d as timber the oaks, especially the well-grown s, were felled, while the beeches were allowed to ain.

ith the exception of parts of western Jylland, re the climatic and edaphic conditions do not w the growth of beech, and some smaller islands he Baltic (Bornholm) and in the Cattegat (Laesø,) to which the beech has not yet immigrated by ural means, beech forests occur scattered all over country, the southern parts of the islands and the southeastern parts of Jylland having the best developed beech forests.

As Denmark is a very flat country (the highest hill is only 172 meters above the sea) no altitudinal limit for the beech forest occurs, nor are the exposure and the steepness of the slope of any noteworthy importance. On the other hand a climatic factor, the wind, has a very strong effect, both directly and indirectly. That the western part of Jylland is destitute of beech is due partly to the effect of the strong western winds which prevail there. The wind acts both as a killing factor by drying the young shoots and also by its mechanical force.

As the soil of the surface in Denmark with few and small exceptions (Bornholm, Møens Klint) is a loose soil, the chemical variations of the surface are not so many as in a country of hard rocks. The differences are due mainly to the greater or smaller quantity of lime and to the varying quantity of water and air in the soil. On well-drained soil which is rich in lime, neither too dry nor too wet, we get the best development of beech forest. As regards the acidity, the sandy and poor soil is rather acid (pH=ca. 4), while the good loamy soil, rich in lime, is much less acid (pH=ca. 6); the beech forest can endure much more lime than the oak; while the oak stands wetness better than the beech. We have beeches growing on nearly pure chalk, and beeches growing on nearly pure sand. Where the soil is very loamy and the height of the underground water is very high, e. g., on the low island Lolland, the beech forest is poor, in spite of the other conditions of life being favorable.

The tallest and best developed beeches in Denmark reach a height of about 40 meters and the girth of the trunk at about 1 meter from the ground is about 6 meters, but usually the good beech forests are not more than 25 to 30 meters high and the poorer ones of course much less, until in places much exposed to wind the beech is a shrub reaching a height of only

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aper read at the Fifth International Botanical Congress, Cambridge, and, 1930.

1 to 2 meters. The ages of the older beech forests are not more than about 250 years, although single trees are said to reach an age of 300 to 400 years. Usually the forests are exploited when the trees are 80 to 150 years old, which seems to be the most profitable age.

A natural regeneration of beech trees takes place where the soil is good and fertile ("muld" or mild humus) and the other conditions of life are favorable. On the other hand where the soil is poor and acid ("mor" or raw humus) and the other conditions not favorable a natural regeneration does not occur. There it is necessary to break up and manure the surface layers of the soil, and then sow the fruits or plant the young trees. In this connection it is natural to mention that owing to the dense shade hardly any other trees are able to grow up under the canopy of a beech forest. When it is not too dense, a few other individuals may be found and then a growth of the young beeches themselves. Under the densest canopy the light is not sufficient for growth—in young beech plantations the light intensity is not more than one-fiftieth of that outside the forest. For the same reasons few shrubs live under the beeches—*Sambucus nigra* and *racemosa, Lonicera xylosteum* and a few others. There is a very marked contrast in this respect between the beech and the oak forest.

The ground vegetation is very uniform in any one locality and it is composed of few species, but owing to the differences in the soil there is a long series of plant communities, mostly in relation to the degree of acidity of the soil. Where the acidity is not high (pH 6 to 5) the ground vegetation is composed of *Anemone nemorosa, Asperula odorata, Mercurialis perennis, Corydalis cava, Ficaria, Ranunculus auricomus, Primula elatior*, etc.; while on a somewhat poorer soil the five last are absent, and in some places Oxalis and Galeobdolon replace them: still poorer is a pure or nearly pure community of Anemone and *Oxalis acetosella*. When the soil is raw humus Trientalis, Majanthemum, *Deschampsia flexuosa, Convallaria majalis*, and in places *Vaccinium myrtillus* are the dominating species. According to recent investigations by Dr. C. H. Bornebusch we may distinguish between "ground types" and "phenotypes" (Grundtyper og Tilstandstyper), the latter being the expression or result of the ground type and the existing conditions of life (e. g., age and density of the beech trees, the effect of the wind, etc.).

The types of the ground flora are so different that the author is inclined to consider the beech forests as consisting of several (or at least two) natural communities.

The effect of the conditions of life on the growth of the beech trees is also seen in the degree and composition of the epiphytic cryptogam vegetation (lichens and mosses). The tall and slender trees of good beech forest on mild humus bear only a slight cover of small crustose lichens and few and inconspicuous mosses, while the slow-growing and low beech trees on poor and wind-exposed places have a rich stem c ing of larger lichens and mosses. The flora of the l fungi is very different according to the health c beech forest, agarics are different in species in the "muld" soil and in the raw humus. The beech have always mycorrhiza.

There are no species absolutely exclusive tc beech forest. The few rare species which have found only in beech forests, e. g., some orchids, their exclusiveness not to the beech but rather t large quantity of lime in the soil.

The exploitation of the forest is rather intensive the culture has been brought up to a high standa both the State-owned and the private forests. wood of the beech is used partly as fuel and partl making different kinds of tools. The result ha mentioned above, been a much purer beech forest would exist under natural conditions.

There is practically no grazing in the Danish b forests and practically never fire in them.

The attacks of both plant and animal para mostly insects, are sometimes rather serious, anc purity of the beech forest adds to the danger.

As to succession, the existing pure beech forest artificial forest, which could not continue if the f were left to itself. It has developed by the influ of man from a mixed deciduous forest in which beech was intermingled with oak, elm, ash, lime, other trees and in which the shrub layer was m better developed. The foresters try nowadays tc that type of forest back again, as the pure beech cc ing has impoverished the forest soil so much tha many cases the forest is not able to regenerate as b forest. It may become a spruce forest, which is n more acid, or even heath.

There is a fairly well-known paleontological su sion of the forest from the first forest which for after the late glacial heath and tundra until now. beech immigrated at rather a late epoch, but no late as was thought to be the case a few decades ag

Growth Plot Established on Mexi Forest

Extension Forester Adolfo E. Galicia, Mad Chihuahua, Mexico, writes that the first perma forest sample plot in Mexico has been established the town of Madera, Chihuahua, on lands belongin the Mexico Northwestern Railway. The plot i square of one hectare, and contains 1,410 western ye pine seedlings. The soil is stony and is rated as sec class. The altitude is 6,994 feet. In general seedlings on the plot are nine years old, the area ha been cut over by the Madera Co. (Ltd.), in 1922. average height of the seedlings is 6 feet and t average diameter at a height of 1 foot is 3 inches. data obtained from the plot will be compared with t obtained in the western yellow pine stands of Ariz and New Mexico.

cerne-in-Quebec Association Practices Forestry

ucerne-in-Quebec Community Association (Ltd.), a idiary of the Canadian Pacific Railway, is now aging 125 square miles of forest on a sustained l basis, writes G. R. Lane, who is chief of the forest's ective service. H. D. Heaney is woods inspector. forest is situated on the north side of the Ottawa er between Montreal and Ottawa. Improvements ude 3 fire towers, 8 miles of forest highway, 41 s of telephone line, 11 ranger cabins, and 80 miles ood trails. Lakes within the forest boundaries ber 116.

he staff consists of one inspector, two assistant ectors, a telephone maintenance man, a teamster, six rangers.

1931, 35,000 Norway pines, white spruces, and way spruces were planted. Hereafter it is proposed lant at least 100,000 transplants annually. Each ger is growing planting stock for use on his own tory. Silvicultural thinning of the present forest ds is well under way.

ish and game on the area are protected for the nbers of the Seigneurie Club. The deer population timated at 500.

tish Columbia Study of Influences Affecting Seed Production

o obtain data on factors influencing the quality quantity of seed produced by conifers, British umbia foresters at the Cowichan Lake Experiment ion began in 1931 to make observations on 65 viduals of Douglas fir, lowland white fir, western cedar, and western hemlock at a series of seed-tree ions in the neighborhood of the station. The ervations are calculated to yield information re- ng to the effect of weather on seed production, the rval between good crop years, the ages at which different species begin to yield seed of good quality, and the relation between vegetative growth and seed production. Trees were chosen to represent the greatest possible variety of age classes. Their heights were carefully determined and the leader growth for the year was measured. Cones were counted through the transit telescope on a definite portion of the crown, the bounds of which were usually defined by two recorded angles on the transit. Cones were collected from several trees of each age class for tests of seed viability. Weather records will be carefully correlated with seed production. Soil samples gathered at intervals throughout the growing season from the different soil horizons will be analyzed for pH, carbon content, free nitrogen, and total nitrogen.

It is proposed to continue these observations for at least 10 years.

Cambridge Board Would Drop Forestry

The general board of the University of Cambridge, England, is reported by Science to have recommended suppression of the university's forestry department, on the basis that openings for trained foresters are practically limited to the small number offered by the Government forest services, that four university schools other than that at Cambridge are engaged in training candidates for these posts, and that university policy in forestry teaching can not be reconciled with the present official view. According to the board's recommendations examinations in forestry for the ordinary B. A. degree would be discontinued after 1934 and examinations for the diploma in forestry would cease in October, 1935.

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The National Forestry Association of Mexico was formed October 23, 1931, with Eulogio de la Garza Ollervides as secretary general. Offices of the association are at Av. Francisco I. Madero No. 16, Mexico, D. F.

Personals

oseph Kittredge, jr., has resigned as silviculturist at Lake States Forest Experiment Station after eight rs at that post, to join the forestry faculty of the versity of California. Doctor Kittredge's connec- with the United States Forest Service dates from 3, the year when he received the M. F. degree from rvard University. His Ph. D. degree was conferred the University of Minnesota. The professorship ch he has accepted, a newly created one, is in the eral field of forest influences, and is the first such ognition in this country of the place of forest uences.

C. M. Granger, director of the Forest Survey, United States Forest Service, has been elected president of the Society of American Foresters for 1932 and 1933. John D. Guthrie, assistant regional forester in the North Pacific Region, is again vice president. Members elected to the council of the society for the 4-year period beginning with 1932 are E. L. Demmon, director of the Southern Forest Experiment Station; C. F. Korstian, professor of silviculture, Duke University; Hugo Winkenwerder, dean of the College of Forestry, University of Washington; and A. F. Hawes, State forester of Connecticut.

Albert E. Wackerman is being reinstated at the Southern Forest Experiment Station, from which he resigned several years ago to become forester for the Crossett Lumber Co., Crossett, Ark. He is taking over in part the work in financial aspects of forestry formerly handled by Edwin A. Ziegler, now head of the Pennsylvania Forest Research Institute.

Members recently appointed by the Secretary of Agriculture to the northeastern forest research advisory council are Burton S. Ward, Moretown, Vt.; S. B. Copeland, vice president, Eastern Manufacturing Co.; George N. Ostrander, manager, woodland department, Finch, Pruyn & Co.; and Lawrence F. Whittemore, general manager, Boston & Maine Railroad. Members reappointed are R. T. Fisher, director, Harvard Forest; G. W. Sisson, president, Racquette Paper Co., Potsdam, N. Y.; and J. H. Foster, State forester, New Hampshire.

L. S. Matthew has resigned as extension forester in North Dakota to take charge of the North Dakota State forest nursery, at Bottineau, succeeding G. H. Wiggin, now forester for the University of Kentucky. Before accepting appointment as extension forester three years ago Mr. Matthew served for several years as inspector in forestry work at the Northern Great Plains Field Station, Mandan, N. Dak. John Taylor, a native of North Dakota who received forestry training at the North Dakota School of Forestry and the University of Idaho Forest School, succeeds Mr. Matthew.

Joshua A. Cope, extension forester of the New York State College of Forestry, expects to spend about half the year 1932 in European travel. Leaving this country in January, he plans to visit Germany, Denmark, Finland, Norway, Sweden, England, France, and Switzerland and to return about the first of August.

Preston P. Patraw has been made superintendent of the Zion and Bryce Canyon National Parks. Mr. Patraw has served as assistant to the superintendent of the Hot Springs National Park and as assistant superintendent of the Grand Canyon National Park.

Lenthall Wyman, of the Southern Forest Experiment Station, has been granted a patent on a tool to be used in scarifying trees for naval-stores production. The tool is shaped somewhat like a drawshave, the knife-edge being about 4 inches across and curved so as to make a flat crescent-shaped cut. The design of the tool is adapted to conservative chipping. Mr. Wyman has dedicated the patent to the Government.

Ben E. Bush, State forester of Idaho, is president of the Association of State Foresters for the current year. Harry Lee Baker, of Florida, is vice president, and Ralph F. Wilcox, of Indiana, is secretary-treasurer. W. G. Howard, of New York, and B. M. Lufburrow, of Georgia, are members of the executive committee.

James N. Templer, since 1925 assistant supervisor the Deerlodge National Forest, Mont., has been ma supervisor of the Helena National Forest, in the sa State. He succeeds L. C. Hurtt, who was recen transferred to the Northern Rocky Mountain For and Range Experiment Station to take charge range investigations.

S. D. Anderson, formerly supervisor of the Super National Forest, Minn., is now assigned to regio headquarters of the United States Forest Service Milwaukee for special work on transportation proble involved in forest protection work.

Victor A. Beede has been appointed to the facul of the department of forestry, Pennsylvania St College, to teach forest mensuration and forest mana ment as successor to D. B. Demeritt, now associ professor of forestry at the Iowa State College. M Beede, who is a graduate of the Yale School of Forestr has had wide experience in woods work. For the p 12 years he has been connected with the Brown C Berlin, N. H., and the Brown Corporation, Quebec.

J. L. Van Camp has been appointed instructor in t department of forestry, Michigan State College. will have charge of the forest nursery of the colle will conduct courses in nursery practice and in seedi and planting, and will engage in silvical resear Doctor Van Camp comes to Michigan from S katchewan, where he had charge of one of the Domini forest nurseries. He is a forestry graduate of t University of Toronto. His work for the docto degree was directed by Doctor Faull, of Harva University.

Paul Thompson, a forestry graduate of the Oreg State Agricultural College, is a full-time fores instructor in the college this year, as a result of rea justments necessitated by the absence of Profes Starker on sabbatic leave.

John C. DeCamp, while on leave from the forest department of the Michigan State College, is directi forestry and other conservation activities of t Hiawatha Sportsman's Club, which owns a 42,0 acre tract in the Upper Peninsula of Michigan.

Members of the American Geophysical Union who O. E. Meinzer, chairman of the section of hydrolog has appointed as a committee to cover the subjects infiltration and transpiration are Charles H. L (chairman), Harry F. Blaney, Lynn Crandall, S. Harding, W. C. Lowdermilk, B. E. Livingston, Jo E. Weaver, and W. N. White.

Percy M. Barr, who for some years has had char of British Columbia's forest research work, has go to the University of California to teach forestry duri the remainder of the present school year. Doct Barr is a graduate of the Yale School of Forestry.

Bibliography

ribution and Mechanical Properties of Alaska Woods

By C. L. Hill, United States Forest Service

e increasing demand for information in respect e resources of Alaska has been met, for the Alaskan s and timber trees and the properties of their s, by a recent publication of the United States t Products Laboratory.[3] The bulletin is characzed by the thoroughness and excellence which come to be expected in publications from that atory. So far as space permits, everything is gathered together that could be helpful in judging usefulness and availability of the tree species ssed.

e introductory pages give a concise description of mber resources of Alaska, indicating the division forests into coast and interior types and the minating importance of the former type. This al forest, which is composed primarily of hemlock Sitka spruce, with western red cedar as a frequent iate and Alaskan cedar more sparsely represented, gely included within the Chugach and Tongass nal Forests. The Forest Service policy in respect nese forests is stated as being primarily "the ding of a continuous and adequate supply of er for the present and future wood-using industries e region." A paragraph deals with the present er production and export of the Territory and the ble future yield of its forests.

out 15 pages are devoted to describing the nine r species of the region, each individual species ption following this outline: Other names, general ption, distribution and growth, supply, producproperties, principal uses. The species described Alaska white birch, Alaska cedar, western red , northern black cottonwood, mountain hemlock, rn hemlock, balsam poplar, Sitka spruce, and spruce. They are listed in the order here given, n carries through tabulations as well as text. To ester it is a little irksome to find broad-leaved es and conifers mixed so indiscriminately in the g. This was doubtless thought to be justified by act that the total number of species is very ; even so, it seems that the list would have been usable if the two categories had been segregated. ree tables (Nos. 2–4) giving the average mecal properties, by localities of origin, of Alaskan ther woods are prefaced with a short explanation of the general nature of the mechanical tests employed. Table 2 gives data for Alaskan woods of 8 of the species previously described (the omission of northern black cottonwood is not explained), Table 3 for "woods from the United States proper whose range of growth includes Alaska," and Table 4 for woods of 8 Alaskan species and 10 other species, native to the continental United States, with which it is desirable to compare them. Since the species included in Tables 2 and 3 are identical, it seems that the author might well have combined these two tables, enabling the reader to compare the Alaskan values with those for wood from the States without the inconvenience of referring to different tables on different pages. The values in Table 4 are averages for all localities for which comparable data were available.

The author explains clearly, in some 12 pages, the nature of the various standard mechanical tests on small clear specimens, the significance and application of their results, and the criteria of variation of properties with specific gravity, the reliability of averages, and the probable deviation of individual specimens from the averages. The final pages of the bulletin proper are devoted to description and results of certain tests carried out at the former Seattle branch laboratory of the Forest Service on full-sized sawed structural timbers of Sitka spruce and western hemlock and on full-sized round mine timbers of Alaskan birch, western hemlock, Sitka spruce, and white spruce.

An appendix of some 25 pages gives the detailed test data on the individual structural timbers for which average test results are given in the body of the bulletin and, finally, a classification of green and air-dried western hemlock timbers according to grade which adds materially to the helpfulness of the volume.

It may be remarked that in this bulletin all the results tabulated are expressed in terms of the most exacting engineering practice. Composite strength values such as were used in Department of Agriculture Technical Bulletin No. 158, likewise prepared by the Forest Products Laboratory, would apparently have been more useful to a large proportion of the lay or semitechnical users of the publication. This suggests that the audience contemplated by the author was less the local users of Alaskan timber than the engineers of large timber or paper manufacturing interests.

The bulletin is illustrated by a number of plates, which contribute to the reader's understanding of the character of Alaskan forests and the way in which timber material was selected for testing. The laboratory was fortunate in being able to have a higher grade of paper used for these plates than that which in recent years has practically destroyed the illustra-

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rkwardt, L. J.: The Distribution and the Mechanical Properties ka Woods. U. S. Department of Agriculture Technical Bulletin . 80 pp.

tive value of photographs in not a few Government bulletins otherwise highly valuable. The text is well written, in the terse style of the engineer. Some small imperfections have resulted from grammatical carelessness and inept punctuation.

A Light-Burning Study in Africa

By E. N. Munns, United States Forest Service

Among ecologists and foresters of Africa the "light-burning" problem is the subject of a controversy almost as lively as that which centers around it in America. We are further along because in this country the results of woods burning have been observed and studied for many years, whereas in South Africa the question to burn or not to burn is of comparatively recent origin. Furthermore we have not had to contend with the health argument for burning, whereas in South Africa the use of fire is widely advocated as a method of eliminating the tsetse fly, that dread carrier of sleeping sickness. This fly, like chiggers and ticks, is commonly found in brush-covered localities.

Recently John F. V. Phillips, forest research officer of Tanganyika Territory, East Africa, has made a rather general study[4] of the problem in southern Africa. Among his conclusions are the following:

Vast stretches have been kept in an "open" condition by annual or nonperiodic fires.

Fire has been an important factor in vegetational development and possibly in the elimination of certain growth forms.

Fire profoundly affects the behavior of animals associated with vegetation.

Fire brings about changes of far-reaching consequence in the physical, chemical, and biological conditions in soils.

Certain plants can be termed fire-indicators; that is, they develop under a practice of burning and their presence may indicate the frequent occurrence of fire.

Controlled burning is a *useful* and *oftentimes necessary* agent in veld management and in tsetse-fly control. (Italics are those of the author.)

The author urges that "generalizations regarding the influences of firing should be made only after the local circumstances have been examined."

Phillips sums up his experience by saying: "On reviewing what is known of the influences of firing in South and East Africa, I feel it desirable to urge the need of our carefully considering all regional circumstances in the light of scientific experience before we definitely decry the practice of firing. Possibly I may be criticized for this statement, but in making it I consider I have done my duty."

With such a statement even the ardent prote ists in America must agree. It is only through investigations that we shall be able to arrive a truth, and what may be true for one vegetative or ecological condition may not be true for an Generalizations based on limited knowledge of c tions in one region have been held all too free apply widely to other regions where condition entirely dissimilar. In spite of all our beliefs a spite of research to date, there is much yet to lea to the possible use of fire in land management. loose talk and more clear thinking should charac American consideration of the problem.

A Neglected Range Story

By William A. Dayton, United States Forest Service

On a recent visit to my office Earley Vernon Wi well-known writer on agricultural subjects, pe most familiar to members of the Forest Service as author of Chesnut and Wilcox's elaborate report Stock-Poisoning Plants of Montana (published in 1 presented me with a copy of his bulletin The Gr Industry.[5] It seems desirable to apprise forester others interested in the history of the western r and its problems of the existence of this valuable p cation, which apparently has failed to attract attention it deserves, probably owing to the fact although it pertains to the range country of the we United States it was published in Hawaii. Prof Wooton names the bulletin, but does not quote i one of the bibliographies of his publication The I tion of Land Tenure to the Use of the Arid Grazing L of the Southwestern States (U. S. Department of culture Bulletin 1001, published in 1922), and tor Sampson does likewise in his Livestock Husba on Range and Pasture (1928). These, however, ar sole references to it that I have thus far noticed i range literature.

This bulletin by Doctor Wilcox gives the histo the public domain, with general description of the l and notes on their extent, topography, climate, vegetation, economic uses, forage plants, wild rodents, and insect pests, and also on such subje fires, effects of overgrazing, and methods of r management and improvement. The bulletin sho very wide range of reading, and one of its most valu features is an excellent résumé of the published r literature available at the time when it was wri Some of the passages are of especial interest becau their having been written more than two decades for example, the author's definition of and note overgrazing, his discussion of the relative influenc various classes of livestock on range, his comment erosion, and his recommendation of open herding of sheep. Many of the older historical notes given y intriguing. One of these relates that Alexander ton, in proposing "the first plan for the disposi- f public lands," suggested that on account of ened deficits in the Federal Treasury the wishes italists should be given priority over those of settlers; another quotes President John Quincy s as declaring in his letter of instructions to in and Rush, the American representatives on egon Boundary Commission, that in that region is no object to any party worth contending for."

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[4] Phillips, J. F. V.: Fire—Its Influence on Biotic Communities and Physical Factors in South and East Africa. South African Association for the Advancement of Science. Report 1930, pp. 352-367.

[5] Hawaii Agricultural Experiment Station, 1911.

Rôle of Tropical and Subtropical lant Growth in Forming Humus

By Bernard Frank, United States Forest Service

impression that tropical and subtropical soils or or lacking in humus is not always correct and used an unnecessary neglect of the culture of ils, P. Vageler declares in his book Grundriss der chen und Subtropischen Bodenkunde.[6]

hapter III Doctor Vageler describes the impor- ôle played by many forms of plant growth in cumulation of organic matter. The greatest ulations occur as shallow peats in standing water the watercourses of sluggish streams such as ongo, Niger, and Zambesi Rivers. Papyrus ions in Africa often reach a depth of more than ters. They contain very little solid matter, er, and on drying shrink to a small fraction of ormer volume and weight. When drained they measurably superior agriculturally to the good earing temperate soils.

low peat formations are limited to definite es. In regions of high uniform as well as of ittent precipitation forest moors are much more read, as in Borneo and Sumatra. They are al product of forest swamps covering poorly d lowlands. These forests are simple in com- n and form, in striking contrast with the luxu- irgin upland forests. The humus cover is seldom than 1 meter deep and then only over subsur- epressions. Agricultural drainage is hardly able because of the thinness of the organic and the considerable leaching out of essential nutrients from the upper strata of the subsoil.

deep peat formations of the Tropics differ her from those of the Temperate Zones. Al- highly acid, with costly drainage and mineral ation they provide the rich mediums for tea in India and for the cultivation of the oil In temperate climates the corresponding for- s are at best only second-rate mediums.

rain forest, the many-storied virgin forest of ropics, produces annually a larger quantity of c material than any other type of forest on —at a conservative estimate, 100 to 200 tons per hectare. In a temperate climate humus layers a meter deep would result; but in the dampness, semidarkness, and warmth of the rain forest, decomposition is so rapid that humus seldom accumulates to a depth of even 20 centimeters.

Beneath the shallow humus there often occurs a red or yellow soil which appears to contain no organic matter but which actually contains in some cases 10 per cent or more of humus in its upper strata. A similar soil in the temperate climates would be very dark colored. This tropical soil gives the high acid reaction typical of virgin forest soils, unless the parent rock was highly basic. In that case the entire soil structure is different; the soil becomes weakly acid and exceedingly rich in plant nutrients to a great depth, and organic content may exceed 20 per cent. Unfortunately such soils are limited in extent, developing mainly from volcanic deposits of basic types such as occur in the Dutch East Indies. No other tropical soil type is so amenable to good management. Yet, with improper care, its qualities are easily destroyed.

The monsoon forest, representing a distinct transition from the rain forest, is of very simple composition. It produces annually about 50 tons of organic matter per hectare, which, in lowlands, may develop forest bogs. Elsewhere accumulation is relatively slight, decomposition being very rapid because of the high soil temperatures and the exposure to light caused by leaf shedding at the start of the dry season. A more or less decomposed leaf litter several centimeters deep overlies either a very thin, slightly organic layer, which quickly merges into the red subsoil, or the pure mineral soil itself.

The savanna is a formation which approaches the high grass type but in which trees and shrubs are still dominant enough to characterize the landscape. It produces little less organic material and has hardly less humus in its soils than the monsoon forest. This is true also of the bush forests interspersed with the savannas and occurring where annual precipitation ranges from 1,100 to 1,500 millimeters.

The tropical steppes are best developed over vast areas in West Africa and Central and South America having a minimum annual precipitation of about 600 millimeters concentrated in torrential downpours during a major rainy season and having a dry period of equal length. This holds especially for the high grass steppes on which occur trees and shrubs of the umbelliferae family, and for the "orchard" steppes.

The humus content of the high grass steppe soils is very slight; humus layers are lacking entirely. It is heaviest beneath the patches of forest and shrub growth scattered throughout this type.

If that portion of South America extending to 30° latitude is excluded from consideration, the dry forest and steppe rank as the most widespread vegetative type of the Tropics. In no other vegetative type are plant formations so radically modified by minor, barely per-

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gsgesellschaft für Ackerbau M. B. H. Berlin SW 11. 1930.

ceptible topographic and edaphic factors. These are closely related to the soil-moisture requirements of the vegetation. The smallest depression in which water can collect becomes a soil-climatic "island" permitting the existence of otherwise exotic plant associations. This may be due merely to increased moisture or may result from the alkalinity of the water. A similar condition holds for the mountain slopes and cliff bottoms of the steppe region.

Throughout the arid region the production of organic material is small, and certain factors act to limit closely the accumulation of humus. The hot winds of the dry period scatter the fragile disintegrated grass leaves, depositing them far from their point of origin. Little decomposition occurs in the heat and dryness of the uppermost soil layers. During the rainy period the leaf remains are washed into depressions where moisture conditions permit rapid decomposition. Accumulation is hindered further by fire. The steppe fires, mostly man caused, lay waste annually thousands of square kilometers, destroying the dried plant remains. Carbon is a leading constituent of steppe soils.

Humus formation in conditions of aridity or excess of salts becomes localized, confined to the close proximity of individual shrubs and bushes. The humus is barely decomposed matter, chiefly saturated with salt, such as occurs in the tamarisk bush steppes of alkali regions.

In the desert proper, humus is practically lacking.

Stands established on abandoned clearings or burns in the Tropics have an enormous extent. Very little of the old humus persists. Even a thick humus cover disappears entirely within a few years after clearing or burning. These formations include the secondary savannas of the East Indies, especially in the Malay Archipelago where they consist chiefly of alang-alang, the most frightful weed of cultivated tropical soils.

Soils on which secondary plant associations occur are usually impoverished and undesirably low in humus. This fact must be carefully considered in selecting such soils for cultivation.

Canadian Station for Spruce Research

In a booklet multigraphed on bond paper and illustrated with photographs and maps the British Columbia Forest Service briefly describes the purpose and development of its Aleza Lake Forest Experiment Station. This station, established in 1924, is a center for research work in the spruce forests of the central interior of the Province. Situated on the Canadian National Railway 34 miles east of Prince George, it has an experimental forest of 6,600 acres. Investigations undertaken have dealt with factors affecting natural regeneration of spruce, the effect of soil moisture on the establishment of spruce reproduction, reproduction and growth in spruce-balsam forests after logging, natural reproduction after forest fires, slash disposal, and the extent of decay in balsam.

A Soils Study of Black Rock Fo

By J. T. Auten, United States Forest Service

A recently published bulletin [7] by Harold F. gives a clear picture of the soils of the Blac Forest, based on the results of a cooperative st the Harvard Forest and the Black Rock Forest. Black Rock Forest is located just west of the River at the southern edge of the village of wall on the Hudson. It is privately owned managed by Henry H. Tryon.)

A general description of the forest and of the and geology of the region, and a discussion and tion of podsol and brown earth soils, are follo an explanation of the methods of sampling. Fo sets of profiles were studied, each consisting of separate soil holes so spaced that the triangula demarked by the sample holes varied from 0 0.58 acre. The soil was examined by horizo depth, structure, color, texture, and consis Samples were taken at fixed depths for hum texture analysis. Root concentration was obs also the topography of the site.

In characterizing the soil textures the auth parts from the conventional procedure of usi upper 6 inches of soil and uses the 4 to 6 inch h He does this, he explains, because root concent is at its maximum at this depth and the texture horizon varies little from the average texture four steps from 0 to 18 inches.

It is not clear why this departure was necess desirable, inasmuch as the texture varied only sl from the surface to the 18-inch depth. The z maximum root concentration varies with soil mo distribution and tree species; consequently no depth (aside from the arbitrarily chosen one inches) can serve as a basis for texture classifi and at the same time accommodate itself to var in root development. The author states, to be that such a depth is used because it seems to fi particular case.

The technique of the work and the presentati material are excellent. There lingers in the rea mind, however—this is by no means a criticism work done—a desire for some tangible conne between such an investigation and forestry pla the area. If the work is to be a site evaluation, soil properties must be correlated with tree gr and with suitability to species, or appraised by parison with those of similar areas on which sat tory stands have been established. This is o beginning in working out the problem the three of which are (1) inventory of the soil, (2) suitabili the soil to individual tree species, and (3) possi of yield of the chosen species.

The comment by P. R. Gast which accomp Scholz's report seems to evince a feeling that fu

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[7] Physical Properties of the Cove Soils on the Black Rock For

is needed. It includes a generalized discussion
principles of soil fertility and concludes with the
ient that more sensitive procedures for measuring
ianges brought about by silvicultural methods
eded.

Forestry Courses in Germany

ler the title "Possibilities of Forest Studies in
iny," the foreign relations committee of the Ger-
'orestry Society has published an English version
16-page illustrated booklet outlining the oppor-
s for theoretical and practical training in forestry
re offered by the forest colleges of Tharandt,
valde, Hannover-Munden, and Vienna, and the
institutes at the Universities of Freiburg, Gies-
id Munich. Conditions of matriculation, exami-
s and degrees, language requirements, and ex-
are discussed, and directions are given for ob-
more detailed information. Several copies of
oklet are available for distribution by the Branch
earch, United States Forest Service, Washing-
. C.

Notable Trees of Virginia

ublishing Notable Trees of Virginia, by J. Elton
ick and Mrs. Lynwood R. Holmes, the Virginia
chnic Institute has made a welcome addition to
cords of historic and picturesque trees and trees
it age and size. The 24-page booklet includes
raphs and information submitted by many indi-
s. Among the trees pictured and described are
e oak at William and Mary College, Williams-
which was designated as a line corner on a map
in 1678; trees planted by Washington at Mount
n; a cork oak smuggled out of Spain in 1847;
northern white cedar at Natural Bridge esti-
to be nearly 800 years old. It is unfortunate
he authors have not in all cases been careful to
the species of the trees mentioned. Locations
en with care.

d Utilization Bulletins from British Columbia

r attractive bulletins published by the British
bia Forest Service in cooperation with the Can-
Forest Products Laboratory and the timber in-
of British Columbia deal with the utilization of
as fir, western red cedar, western hemlock, and
(including both Sitka spruce and Engelmann
), respectively. Each bulletin is profusely illus-
with excellent pictures showing a wide range of
oth domestic and commercial. Each contains a
f mechanical properties. These bulletins should
considerable value to anyone interested in the
t of wood utilization. The data presented are
milar to those contained in pamphlets published
from time to time by different lumber manufacturing associations in the United States.

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Buttrick, P. L.: Public and semipublic lands of Connecticut. 151 pp. maps. (Connecticut State Geological and Natural History Survey bulletin no. 49). Hartford, Conn., 1930.

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41; Logging profitable logs, by T. T. Munger
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T. T. Munger and R. H. Westveld.

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C. R. Forsling (reprint); 1486–F, Longlea
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W. R. Mattoon (revision of and supersedes F
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Crop, by W. K. Williams.

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National Forest Administrative Maps: ½-inch, M
gahela, Cherokee; ¼-inch, Angeles, Cabinet,
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U. S. GOVERNMENT PRINTING OF

FOREST WORKER

March, 1932

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UNITED STATES DEPARTMENT OF AGRICULTURE

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Fifth International Congress of Entomology

The Fifth International Congress of Entomology will be held in Paris, July 16 to 23, inclusive, 1932. In conjunction with this meeting there will be a celebration of the centenary of the Société Entomologique de France. P. Marchal is president of the congress, and R. Jeannel is secretary general. Doctor Jeannel's address is Museum National d'Histoire Naturelle, 45 bis, Rue de Buffon, Paris (5).

American Forestry Association to Meet in Baltimore

The annual meeting of the American Forestry Association will be held in Baltimore, Md., May 26-27, 1932, under the auspices of State Forester Besley and the Maryland Forestry Association. The c theme of the program is "Forests and fores relation to water conservation." There will be sessions of discussion and one half-day field trip.

First International Recreation Con

The National Recreation Association has anno that the First International Recreation Congres be held in Los Angeles, Calif., July 23 to 29, 193 week before the Olympic Games. On March association had already been assured that 27 n would send delegates.

◆

The National Conference on State Parks wil its annual meeting of 1932 at Virginia Beach May 4-7.

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ashington, D. C. MARCH, 1932 Vol. 8, No. 2

State Forestry

sconsin Will Spend $500,000 of Relief Fund on Forest Protection

he Wisconsin Conservation Commission's share of State's emergency relief appropriation was $500,000. commission announced that it would begin at to spend this money by employing men for forest- ection work. A part of the money would necessarily pent for hand tools, but none of it would go into the hase of major equipment. The leading project he program of work decided upon is developing roads to inaccessible areas, a purpose for which dreds of miles of abandoned logging grades are lable in Wisconsin's forest areas. Other work will ıde constructing firebreaks, telephone lines, ranger lquarters, substations, lookouts, and warehouses, suppressing fire.

ligibility for employment is conditioned on six ths' residence in the State, and preference is given ocal residents with dependents. The widest pos- distribution of relief will be sought.

onomical Method of Burning Rights of Way

istrict Wardens Weaver, of New Milford, Conn., Kugeman, of Cornwall, Conn., hope to save time money in burning railroad rights of way this spring ollowing a method which they tried out in 1931 the cooperation of Supervisor Cronin, Housatonic sion, New York, New Haven & Hartford Railroad. herever the railroad runs at the base of a steep of either brush or grass land, permission is asked ne property owner to burn a strip at least 100 feet 50 feet wide. When permission is given the men a path at least 3 feet wide on the outside limit ed upon. A strip of sod about 1½ feet wide is cut mattocks and is turned over downhill. Then a with a torch starts the fire in a line parallel with path and about 5 feet downhill from it. Men pumps, brooms, and shovels watch closely to see no fire gets across the path. As soon as this line afe a new line is started 50 feet down the hill. n the second fire meets the upper fire it is safe to the fire at the track.

The sod can be cut at times when it is not feasible to start burning—early in the morning, during the last hour of the working day, or on cloudy days. The second year, raking the leaves off the path makes it ready for use again.

Wardens Kugeman and Weaver found that a crew of from 12 to 15 men is about the right size for this work.

Virginia Commission Recommends That Forest-Protection System be Expanded

Substantial increases in Virginia's appropriations for forest fire protection are urged in the report presented this year by the commission appointed to study the forestry conditions of Virginia under provisions of an act of the State legislature approved March 24, 1930. At present, organized forest fire protection is lacking in 42 counties of Virginia. The commission's recommendation of increased appropriations for fire protection is prefaced with this statement: "The commission can not too strongly express the present need of sufficient funds to permit the organization of the entire 100 counties for forest fire protection. The need is so great that it amounts to an emergency."

As a fire-preventive measure the commission recommends enactment of a state-wide "no fence" law, that is, a law relieving landowners of the responsibility of fencing their land to exclude livestock running at large. Considerable evidence presented before the commission tended to prove that in certain parts of the State not covered by "no fence" laws fires are repeatedly set on land by persons other than the owners with the intention to have their livestock graze on the land and in the belief that fire will improve the grazing. The commission recommends enactment of a statute declaring that any person, firm, or corporation responsible, through wilfulness or negligence, for the origin of a forest fire shall be liable for all costs incurred by the State, the county, or both State and county in suppressing the fire.

In the opinion of the commission Virginia should proceed as soon as possible to establish four or five demonstration forests in different parts of the State, with a maximum area of 10,000 acres each. This would be mainly an educational measure. It is recommended also that laws be enacted providing for the establishment of a small forestry demonstration plot at or near every country and small-town public school in the State.

Under certain conditions the commission favors free distribution of forest tree seedlings produced at the State forest nursery.

The act creating the commission charged it to make a careful study of different methods of taxing forests and waste lands in other States and attempt to ascertain what methods of taxation of forests and waste lands in Virginia would have the most favorable effect upon the agricultural and industrial welfare and prosperity of the State. Having made such a study the commission recommends that legislation in Virginia looking toward any far-reaching change in the method of taxing forests and waste lands be deferred until the Forest Taxation Inquiry of the United States Forest Service has published its final report.

C. H. Morrissett, State tax commissioner, was chairman of the commission. The other members were Paul Ryland Camp, of Southampton; R. H. Langhorne, State senator, of Campbell; W. Stuart Moffett, assemblyman, of Augusta; and Jaquelin P. Taylor, of Orange and Richmond.

Survival High in Hawaiian Plantations

Reports on plantings made on Hawaiian forest reserves which were compiled in 1931 by the Territorial forester showed that of 150,555 trees planted during the preceding 10 years 88 per cent were alive and growing thriftily. The trees were of 44 different species and had been planted on various sites and in various spacings. Plantings of cajeput-tree, white ash, and silky oak made in the preceding two years, constituting 46 per cent of all the trees planted on the forest reserves during that period, had been 93 per cent successful.

During the year ending June 30, 1931, almost 28,000 trees per month were planted on the Hawaiian forest reserves, which at the end of that year had a total area of 1,021,314 acres.

Maryland Fires of 1931

Forest fires in Maryland in 1931 numbered 1,086 and covered 28,525 acres of land, the State department of forestry reports. This acreage amounts to 1.3 per cent of the State's forest area. The average acreage per fire was 27, which is smaller than that recorded for any year of the past decade except 1927. Two fires, occurring in Washington and Allegheny Counties, covered more than 1,000 acres each, and 58 fires covered more than 100 acres each. Most of the large fires occurred in the middle of April. The fires were classified according to cause as follows: Smokers, 431; brush burning, 279; incendiary, 167; railroads, 88; campers, 29; lumbering, 4; lightning, 2; miscellaneous, 83; unknown, 3.

California Maintains 2,000 Men in For Labor Camps

California's current appropriation for firebreak c struction recently became $110,000 when the gover allotted to this purpose $100,000 of the State emerge fund. The money is being used largely to maint unemployed men in forest labor camps, principa for the purpose of constructing firebreaks at the lo edge of the coniferous timber belt in northern Califor and in strategic locations for the control of fire southern California brush fields. At the end of Ja ary 2,000 men were enrolled in such camps. The n work from five to six hours a day, without wag They are provided with food and essential articles clothing at State expense. Certain other costs incl ing those for medical care and tobacco are met counties, cities, and private agencies. The camps the work are supervised by State and Federal fo rangers.

Society for Protection of New Hampsh Forests Acquires Additional Areas

Twenty-six strips of forested land along New Ha shire highways became public property in 1931, three more in January and February of 1932, rep Philip W. Ayres, forester of the Society for Protect of New Hampshire Forests. In cooperation with New England Council and the New Hampshire St Federation of Women's Clubs this society has b working for years to perpetuate roadside beauty having timberlands bordering roadsides brought i State or town ownership or by acquiring them it These new acquisitions, most of which were gifts, r the total number of such reservations to 102. Fo reservations now border about 35 miles of highwa New Hampshire. Some of them are 165 feet w which is about as far as the highway traveler can into the woods in winter. Others are 125 feet wide as far as he can usually see in summer. A few incl only the timber growing within the limits of highway.

Under the auspices of the Society for Protectio New Hampshire Forests 15,000 trees were plante school yards and 15,000 along highways last yea commemoration of the George Washington Bicen nial. The campaign for planting bicentennial t is being continued this year. The State fore department provides the trees, and landscape ar tects of Dartmouth College and the State univer are assisting.

The society is seeking to acquire 1,600 additi acres on Mount Kearsarge, where by joint action the New Hampshire Forestry Department it acqu 1,350 acres some years ago. The purchase price i an acre, and the option expires September 1, 1 The society is now at work on improvement

nconia Notch, where 6,000 acres became public
perty four years ago. It is planned to build two one-
r roads through the notch, one on either side of the
iigewasset River. In 1931 the notch is believed
iave had 1,000,000 visitors.

rom June 20 to July 2, 1932, the society will hold a
ure school at its Lost River Reservation. L. M. Gould,
was geologist with the Byrd South Polar Expedition,
conduct some of the classes in field geology.

Connecticut Plan for Bicentennial Planting

he Connecticut Forest and Park Association, in co-
ration with the Connecticut State Highway De-
tment, has made an offer to individuals, clubs, and
ociations that simplifies participation in the plant-
of a mile of roadside shade trees to commemorate
George Washington Bicentennial. The association
offered to plant one or more trees at the rate of $5
tree, identifying each tree for the donor and for its
records by attaching to it a small numbered metal
. The bureau of roadside development of the
e highway department has assumed responsibility
choosing suitable tree species and supervising the
tings, and will replace any trees failing to survive
first year.

* * *

he Georgia Commission of Forestry and Geological
elopment has done away with the offices of assistant
e foresters and divided the State into eight districts
a district forester in charge of each. Headquar-
and district foresters of districts 1 to 8 are as
ows: 1, Rome, W. D. Young; 2, Gainesville,
rett B. Stone, jr.; 3, Augusta, Charles N. Elliott;
olumbus, W. G. Wallace; 5, Macon, H. M. Sebring;
avannah, Jack Thurmond; 7, Waycross, C. Bernard
le; 8, Albany, H. D. Story, jr.

Georgia to Operate Two Tree Nurseries

An 11-acre tract of land on the Dougherty County farm, near Albany, Ga., has been selected as the site for a tree nursery to be operated by the Georgia Division of Forestry. The site is on the Albany-Newton highway. Dougherty County and the city of Albany are cooperating with the division of forestry in providing not only land but water.

This nursery will be devoted largely to growing planting stock of slash and longleaf pines, which are native to that part of the State and are in great demand. H. D. Story, jr., the local district forester, is to have charge. He expects to have about 1,750,000 slash, longleaf, and loblolly pine seedlings ready for distribution in the fall of 1932.

A site for a second State tree nursery has been chosen on the grounds of the Georgia Experiment Station's mountain branch, in Union County near Blairsville. The area selected is on the Appalachian Scenic Highway. State Forester Lufburrow announces that this nursery will be used to grow trees indigenous to the mountains, such as black locust, northern white pine, hemlock, spruce, and shortleaf pine, also black walnut, yellow poplar, and other species of trees suited to the upper part of the State. Loblolly pine, Japanese chestnut, and other species will be grown experimentally.

* * *

Acting upon recommendations of the New Jersey Department of Conservation, the city of Newark, N. J., has instituted forestry management on its municipal watershed of approximately 35,000 acres located in Passaic, Sussex, and Morris Counties. John M. Heilman, a graduate of the Pennsylvania State Forest School and of Yale University, has resigned from the State forestry organization to take charge of forestry work on the Newark watershed area.

Education and Extension

rms in Palermo, N. Y., Largely Meet Their Own Timber Requirements

survey of 34 farms in the town of Palermo, Oswego
nty, N. Y., made in the fall of 1931 by Extension
ester J. A. Cope and County Agent H. L. Page,
wed that wood is used as fuel on every one of the
ns. On 19 farms wood is the only fuel burned. The
ntity of fuel wood consumed on the 34 farms in the
rse of a year totaled 1,310 face cords. (This wood
raged 15 inches in length.) Thirteen farm owners
ing some timbered upland are cutting their fuel
d selectively, 14 whose woodlands are chiefly
mp land are cutting clear, and 3 owners cut dead
down timber exclusively.

All but two of the farms have woodlands. Woodland area averages about 30 acres per farm, the size of the farms averaging about 130 acres.

Twenty-three of the woodland owners obtain their fence posts chiefly from their own woods, using northern white cedar, chestnut, black cherry, and hemlock for this purpose. The remainder buy all their fence posts because they have no timber of suitable species. Home-produced lumber only was used on 17 of the 28 farms on which lumber was reported to be used annually, and supplied part of the lumber needs of 2 others. The home-grown lumber used annually averaged 1,870 board feet per farm.

Forest products sold from 12 farms in the last 10 years had a total value of about $18,485, or $154 per farm per year. Fuel wood sold during that period from these farms brought in about $12,200. (These figures cover some labor.)

Grazing is permitted on the woodlands of 24 farms.

The farms covered by this study are within convenient hauling distance (5 miles or less) of two permanent mills that do custom sawing at a reasonable charge. The town of Fulton is near enough to provide a limited market, at a fair price, for fuel wood. Plants in the vicinity offer a market for hardwood logs to be used for basket veneers and pine logs to be used for crate stock.

Farmers Make Direct Sales of Pulpwood

North Carolina farmers are receiving help from Extension Forester Graeber in marketing small timber cut as thinnings without the intervention of a middleman. Mr. Graeber has circulated questionnaires to veneer mills, furniture manufacturers, manufacturers of lumber, and pulp and paper mills, and as a result has been enabled to circulate to farmers a list of mills to which they may sell direct, showing the kind of wood purchased by each mill. He has also arranged a cooperative contract with a large pulp mill for the sale of 1,000 cords of pine, poplar, and gum wood. Through this arrangement 36 farmers in eight counties have sold from one to eight carloads of pulpwood each direct to the mills, at a price of $7 per cord.

Farmers' social clubs organized some years ago in Halifax County, Va., are handling a trial order for 1,000 cords of pulpwood, arrangements for which were made by County Agent Hall directly with the Bedford Pulp & Paper Co. The order is for 160-foot cords of peeled pine, with a minimum diameter of 4 inches. The clubs are confining this business to farmers who agree to cut the wood as thinnings and weedings.

* * *

"Many of the 250,000 trees planted in the 1929–30 tree-planting campaign in Custer County, Nebr., are beginning to show up as windbreaks and woodlots for farm homes," writes County Extension Agent M. L. Gould. "The broadleaf varieties have done especially well, and many of these are now 5 and 6 feet high. The correlation between the way the trees were cultivated and the growth they made goes to prove that if you want success in a tree-planting project in Nebraska clean cultivation is one of the first things to see to for the first two years of the trees' life."

* * *

A course on renewable natural resources, pertaining to forests, soils, waters, and various forms of wild life, is being given this year in the University of Pittsburgh by O. E. Jennings. Doctor Jennings is head of the university's department of botany and director of the Lake Laboratory. About 20 people, mostly teachers, are taking the course.

Iowa Agriculturists Work to Check Erosion

Iowa suffers an agricultural production loss of a
$3,000,000 annually owing to erosion, which exist
a more or less advanced form on 1,500,000 acre
land in the State, according to estimates by the S
extension service. At least 500,000 acres of this l
is eroded to such a degree that forestation is the
practical remedy, in the opinion of I. T. Bode, u
recently extension forester of Iowa. In eight coun
in the southeastern portion of the State a "Save I
Soils" program has been put into effect, largely thro
the initiative of Mr. Bode. This is a plan to com
erosion through cropping systems, through agricult
engineering measures such as soil-saving dams, ter
ing, and proper land drainage, and through fore
measures including tree planting and conservatio
tree growth. Two trained agents are in charge of
work, each being assigned to a group of four count

During 1930 and 1931 Mr. Bode and local exten
agents got some 65 demonstration forest plantings
erosion control under way, in 29 counties. T
distributed more than 40 pounds of black locust see
farmers in 1930 and 88 pounds in 1931, for use in gr
ing trees for antierosion planting.

Within a few miles of Ames the Iowa Agricult
College has had an erosion-control project in prog
for several years. The soil is deep sandy silt, the
a moderately sloping hillside. Here several large
lies had been formed, some of them almost reaching
highway and one heading for a farmhouse and b
Silt and gravel had spread out over a considerable
in an adjoining field at the foot of the slope. S
stantial dams have been placed across the larger gu
at the base of the slope. Tile piping about 12 in
in diameter has been put in to carry off water reac
above a certain level. At intervals smaller dams
temporary nature have been made by setting a
locust or other posts in a convex curve across the gu
nailing strips of wire fencing to them, and filling in
barrier with brush, weeds, crushed sorghum cane,
Locust trees have been planted along the steep si
and upper slopes of the gullies and also in the botto
especially just back of and below the dams, and on
of the larger dams. In mixture with the locusts h
been planted cottonwood cuttings and sycamore, e
and other hardwood trees. Between gullies sc
northern white pine has been planted. This plan
succeeded to a striking degree in checking erosi
Eventually the entire area of 4 or 5 acres will
planted with trees.

* * *

First place among New Hampshire 4-H club forest
for 1931 was won by 14-year-old Warren Kolb,
Fremont. Working alone, Warren spent 450 ho
cutting out weed trees from farm woodlands.

ew Pulp and Paper Laboratory at Syracuse

contract has been let for the construction of a)00 building at the New York State College of stry, Syracuse, N. Y., to house the semicommercial and paper laboratories of the college, now in the ment of the present college of forestry building. new building will be 160 feet long by 60 feet wide, story and basement structure containing approxi- ely 18,000 square feet of floor space. The labora- s will include an analytical laboratory and a paper tuff laboratory. There will also be a paper- ng laboratory equipped with humidity and tem- ture control, a semicommercial digester room, and per-machine room.

ne semicommercial digester room will contain sters for manufacturing pulp by the various ical processes, of a size to produce from 200 to pounds of chemical pulp from a single cook. proposed to install a sulphite digester and an ine pulping digester, and equipment for manu- uring acid, caustic cooking liquors, and bleach rs. Several pieces of semicommercial wood- aring equipment, such as barkers, chippers, and chip screens, and a mechanical pulp grinder will be installed. The paper-machine room will contain pulp beaters, Jordan engines, and a 30-inch combination Fourdrinier and cylinder paper machine. The cylinder part of the machine has been designed with three cylinders to enable the college to experiment with the manufacture of paper boards, which are of particular interest to New York State because of the large number of paper-board mills in the State.

It is hoped to have this building completed in time for occupancy at the beginning of the 1932–33 college year.

* * *

Alumni of the Yale School of Forestry held their thirty-second annual reunion on February 22, 1932. They convened in Bowers Hall, which was built in 1931 with funds bequeathed by Edward A. Bowers, B. A., 1879, and which provides the School of Forestry with an auditorium, soils and wood-working laboratories, and various offices. Following the reunion banquet, at which Victor Beede officiated as toastmaster, E. C. Richards showed a series of motion pictures taken at the thirtieth alumni reunion and during his recent trip abroad to study forest and game relationships.

Forest Service Notes

Meter for Forest Fire Danger

"fire-danger meter" has been devised by H. T. orne, of the Northern Rocky Mountain Forest riment Station, as an aid to the forest administra- n estimating how large a fire-control organization lled for by existing or probable forest fires. It frequently been observed that supervisors of hboring forests make dissimilar recommendations the fire-control forces they need in a given season riod although the forests are closely similar as to er and fuel types and are subject to identical her conditions. This fact, it is thought, is due ly to differences in the weight given by different rvisors to some of the individual factors in fire er. Greater exactitude in administrators' esti- s of fire danger would tend, of course, to reduce number of instances in which avoidable fire losses r because control forces available are inadequate also the number of instances in which money is ed by maintaining control forces larger than the danger justifies.

r. Gisborne's device represents an effort to sum- ze the results of fire research conducted by the hern Rocky Mountain Forest Experiment Station, knowledge accumulated by men having excep- l experience in fire-control work, in such a way facilitate correct weighting of each fire-weather r. It is an adaptation of the slide-rule idea exemplified by exposure meters used in photography. On its two sides are integrated six fire-danger factors: Season of year, activity of fire-starting agencies, dryness or inflammability of forest fuels, relative humidity, wind velocity, and visibility distance. The meter defines seven classes of fire danger and indicates for each of these its administrative significance, that is, the character of the fire-control organization believed to be commensurate with it.

In its present form the fire-danger meter is being issued for trial and study, with the request that forest officers record the results they obtain from using it and report them at the end of the season. The experiment station has begun a very detailed analysis of its weather, fuel, and fire behavior data in order to check still further the integration of factors and the classification of fire danger.

* * *

The Northern Rocky Mountain Forest Experiment Station has been conducting a series of tests to determine how long and in what quantity tree seed stored in the duff of the old-growth forest remain viable. In these tests quantities of seed are stored under natural conditions for periods as long as eight years. About one-third of the viable seed so stored have germinated in the first two years of storage, before any opening of the forest canopy created light and moisture conditions in which the seedlings could live.

Growth After Cutting

By Quincy Randles, United States Forest Service

Cutting operations in the ponderosa pine type in the Southwest began, of necessity, before it had been determined what methods of cutting would result in the prompt starting of a full stand of reproduction of the better species, and what type of cutting would result in maximum future yields of usable forest products. Intensive growth plots were started by the Southwestern Forest and Range Experiment Station following the early cuttings in order to obtain data on reproduction and growth. These plots, owing to the work involved in establishing them, were necessarily small in size and limited in number. The data from them, covering measurements for the past 20 years, are now of great value in management-plan work, particularly in fixing the length of the cutting cycle.

In order to obtain similar data early forest administrators measured the volume of timber reserved on certain cut-over areas, by a somewhat less intensive method which permits the inclusion of larger areas with a wider range of site and marking conditions. Some of these areas have been remeasured for volume. Under this method the volume increase since cutting represents growth on trees that were of merchantable size (12 inches in diameter at breast height) at the time of the initial measurement, plus the total volume of the trees that grew to merchantable size during the period, less mortality. An area of one section (640 acres) on the Coconino National Forest measured in 1909 had a volume increase up to and including 1930 of 860 board feet per acre, or 3.1 per cent annually, simple interest. A heavily cut area [1] of 9,342 acres on the Coconino with a stand of 659 board feet per acre after cutting in 1904 to 1912 had by the end of 1931 an increase of 526 board feet per acre, or 3 per cent annually. The average acre of this area is now stocked as follows:

Diameter class (inches):	Number of trees per acre
4 to 7	20. 7
8 to 11	3. 2
12 to 20	4. 56
20 and upward	1. 36
Total	29. 82

On the Cibola Forest a section cut over during 1914–15 under the regular national forest marking system in force at that time showed a gain in 17 years of 891 board feet, or 52 board feet per acre annually, an increase equal to 6 per cent annually, simple interest. As in the instance first mentioned, this growth was made up of the total volume of trees that came into the merchantable class during the period plus the increase in volume of trees that were of merchantable size in 1915, less the mortality. In this cas excellent stand of small poles was a very material tion to the volume, as can be seen from a comp: of the rate of growth on this and the aforement area. The number of trees on the average ac 1915 and 1931 is of interest:

Diameter class (inches)	Trees	
	1915	
	Number	*N*
4 to 11	27. 3	
12 and upward	6. 0	
Total	33. 3	

The data obtained from these measurements that net growth on cut-over areas varies accordi several factors, but they give a very good basi fixing the length of the cutting cycle. These dat not, of course, take the place of those obtained intensive sample plots, but rather supplement the

Variation in Weight of Slash Pine W and in its Proportion of Heartwoo

By Benson H. Paul, United States Forest Service

Since wood is sold on a volume basis and wood is sold on a weight basis, it is obviously to the advan of the pulp manufacturer to purchase wood of maxi density. Forest Products Laboratory studies of wood in second-growth slash pine stands of pulpwooc have revealed differences in weight averaging app mately 20 to 30 per cent between samples of wood t from the trunk of the same tree at different heig Comparison of the average weights of wood from di ent stands discloses even greater average differe The lightest average weight determined was tha wood obtained from a very young, rather incomple stocked stand of about 220 trees per acre in which trees ranged mostly from 8 to 16 years in age and f 5 to 10 inches in diameter at breast height. average specific gravity (weight divided by the we of an equal volume of water) of the wood of 37 t from this stand, based on samples taken at inter of 4 feet in the height of the trees, was 0.45.

In another stand in the same locality the ave specific gravity of the wood as determined by an an sis of 26 trees was 0.52. This stand was 27 years It had been thinned to a density of about 300 trees acre at the age of 24 years. The trees ranged f 6 to 13 inches in diameter at breast height, and stand was estimated to contain about 30 cords pulpwood per acre.

In a third slash pine stand containing 840 trees acre, 30 to 35 years of age and from 5 to 8 inches diameter at breast height, the average specific grav of samples taken at 4-foot intervals in 34 trees was 0. This stand was fully stocked and contained appro ely 58 cords of pulpwood per acre. Because of greater age of the trees, pulpwood sticks obtained ı this stand were externally smoother and coned fewer knots than those obtained from the other ds.

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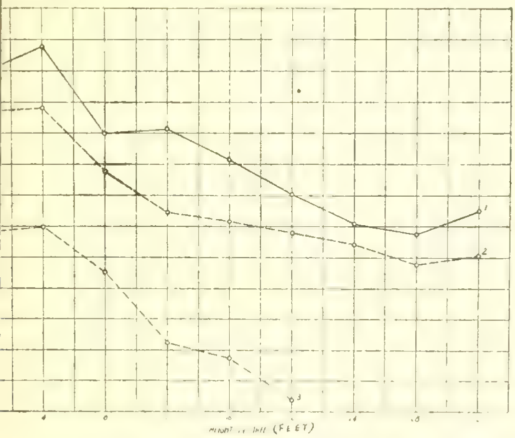
[1] Title to this land had been reconveyed to the United States subject to timber-cutting rights.



RE 1.—Average variation in the specific gravity of slash pine wood n the base to the top of the merchantable length of trees of pulpod size:

1. Trees 30 to 35 years of age
2. Trees 27 years of age
3. Trees 8 to 16 years of age

he variation in the specific gravity of wood at rent heights in trees in the three stands is shown in re 1. The significance of specific gravity of wood erms of pulp yield is shown by Table 1, based on obtained when wood from the three stands was ed by the Kraft process under identical conditions.

LE 1.—*Specific gravity, weight, and pulp yield of slash pine wood from three stands*

Average specific gravity of wood	Weight of wood per cubic foot	Weight of wood per cord [1]	Yield of screened pulp per unit of weight	Yield of screened pulp per cord [1]
	Pounds	*Pounds*	*Per cent*	*Pounds*
0.45	28.0	2,240	44.6	999
.52	32.5	2,600	47.4	1,232
.55	34.4	2,752	47.7	1,313

ne solid content of a cord of wood is assumed to average 80 cubic feet.

Since there is considerable interest at the present time among papermakers as to the influence of heartwood on the pulping qualities of wood of southern species it seemed desirable to compute the volume of heartwood in the trees from each of the three stands, although the quantity of heartwood contained in second-growth stands of slash pine is relatively small. Accordingly measurements were made of the diameter of the heartwood and of the average diameter of the trees at the place where each specific-gravity sample was taken. Heartwood was not present in all trees or at all heights in the trees. The wood from the trees 8 to 16 years of age contained no heartwood; that from the 27-year-old stand contained 3.7 per cent of heartwood; and that from the 30 to 35 year old stand contained 4.3 per cent of heartwood.

Table 2 shows the specific gravity values for the wood at intervals of 4 feet in height in the trees and the proportion of heartwood found in the pulpwood sticks from different heights in the trees. Figures for percentage of heartwood are based on the total volume of the pulpwood sticks and the total volume of the heartwood portion of the sticks.

Although the data here presented show that judicious selection of second-growth slash pine wood may mean a gain of more than 300 pounds in the yield of pulp per cord, and that the heartwood content of slash pine is small, many points relating to the use of slash pine for pulp remain to be investigated. Among these are the desirability of excluding all heartwood from slash pine wood used for pulp, the optimum rotation for growing a crop of pulpwood trees, the cost of cutting pulpwood from trees of different sizes, and the ease of pulping and bleaching versus the yield of pulp per cord. Some of these questions are now being studied by the Forest Products Laboratory for the different species of southern pine. Their solution will make possible more intelligent management of extensive second-growth southern pine stands that are now in the early stages of growth and will help to determine the best use for a large proportion of the 60,000,000 acres of land included in the coastal plain area of the South.

LE 2.—*Specific gravity of the wood of slash pine and percentage of heartwood in pulpwood sticks at various heights in the trees, for stands of different ages and stocking*

of trees, years	Number of trees per acre	Average diameter at breast height	Specific gravity and percentage of heartwood at different heights																			
			Stump		4 feet		8 feet		12 feet		16 feet		20 feet		24 feet		28 feet		32 feet		36 feet	
			Specific gravity	Heartwood	Specific gravity	Heartwood	Specific gravity	Heartwood	Specific gravity	Heartwood	Specific gravity	Heartwood	Specific gravity	Heartwood	Specific gravity	Heartwood	Specific gravity	Heartwood	Specific gravity	Heartwood	Specific gravity	Heartwood
		Inches		*Per cent*		*Per cent*		*Per cent*		*Per cent*		*Per cent*		*Per cent*		*Per cent*		*Per cent*		*Per cent*		*Per cent*
	220	5–10	0.496	0	0.500	0	0.470	0	0.423	0	0.415	0	0.388	0	0.440	0	0.407	0	------	------	------	------
	300	6–13	.574	-----	.576	[1] 3.2	.535	-----	.509	[1] 5.0	.503	-----	.496	[1] 3.9	.489	-----	.475	[1] 2.7	0.481	-----	0.478	1.1
	840	5–8	.598	2.9	.615	4.6	.560	5.4	.563	5.6	.543	4.7	521	4.3	.502	3.4	.495	2.7	.510	1.5	.447	0

Average for 8 feet of stem length.

Number and Distribution of Resin Passages in Slash Pine

By Victor C. Hobert, United States Forest Service

In order to supplement information made available many years ago by Filibert Roth on the distribution of resiniferous tissue in longleaf pine (*Pinus palustris* Miller), [2] a study was made of slash pine (*Pinus caribæa* Morelet) material obtained from three vigorous trees about 14 to 19 years of age that grew near Tarboro, Camden County, Ga.[3] Six disks were cut from each tree at heights of about 2, 10, 20, 30, 40, and 45 feet above the ground. Two blocks containing, respectively, the 1912 and 1917 growth rings (relatively recent normal rings formed before the trees were turpentined) were cut from each of four radii on each disk and used for preparing the sections examined with the microscope.

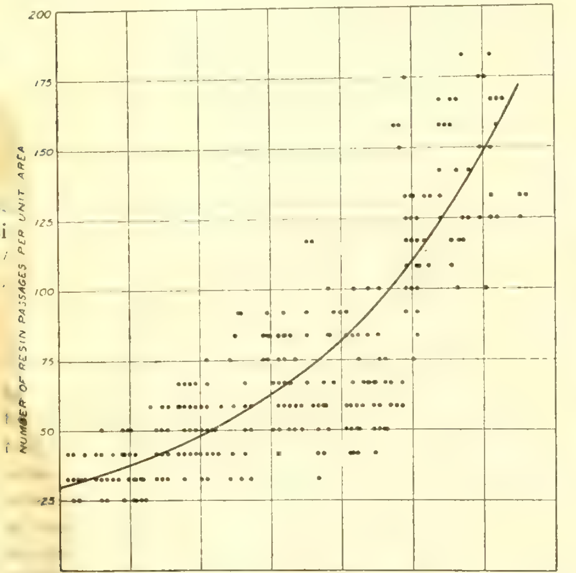


Figure 1.—Number of vertical resin passages in slash pine per unit area (one annual ring in width and one inch in length)

The number of fusiform rays containing horizontal resin passages was determined with a magnification of about 65. Five fields of 0.0021 square inch each were examined on each tangential section. The data thus obtained from 525 fields showed that there were, on the average, 0.71 fusiform rays in each square millimeter, or 458 per square inch of tangential surface. The minimum was none per field; the maximum, 1.27 per square millimeter, or 819 in one square inch.

The average number of linear rays (rays conta no resin passages) was found from the same tange sections to be 31 per square millimeter, or about 2 per square inch of tangential surface. The mini was 25.7 per square millimeter, or about 16,50 square inch; the maximum was 36.5 per square meter, or about 23,500 per square inch.

The corresponding figures for the distributio longleaf pine structures given by Roth, loc. cit., Fusiform rays scattered, sometimes none per sc millimeter and again one resin passage per 1.5 square millimeters or 300 to 400 per square linear rays, 21 to 27 per square millimeter or 1 per square inch of tangential section.

The data obtained in this study of slash pine yi no evidence that the width of the annual ring any relation to the number of linear and fusiform per unit area of tangential surface.

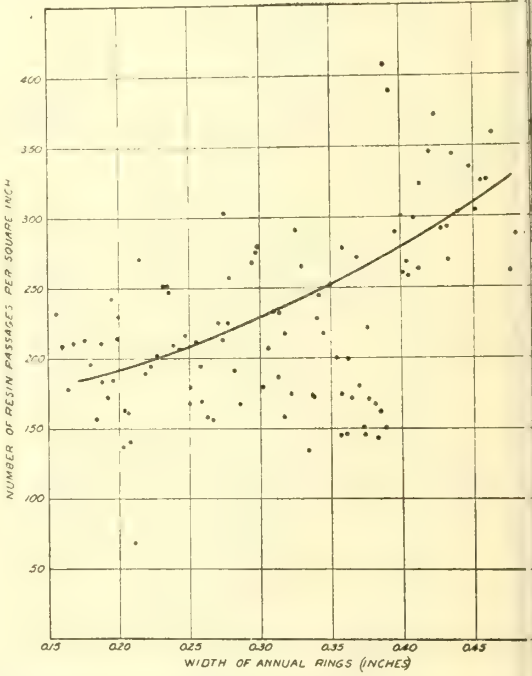


Figure 2.—Number of vertical resin passages in slash pine per squar

A study of the number of the vertical resin pass present was made on cross sections cut from the s blocks as the tangential sections. An average of vertical resin passages per square inch (0.34 per sq millimeter) of cross section was found, with a maxim of 408 and a minimum of 68 per square inch. Fig 1 shows the average number of passages per unit a i. e., tangential inch, for each ring width exami It was found that generally more resin passages w present in the wider rings.

From Figure 2 it is evident that there is a tende for a given area made up of wide rings to have m vertical resin passages per square inch than an equal a le up of narrow rings, although this is not always case. These data differ from the findings of Münch Scotch pine, which indicated that the number of ical resin passages per square millimeter was tively greater in narrow rings and was so consistent Münch's results could be expressed in a mathe- ical formula.[4]

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[2] Mohr, Charles: Timber Pines of the Southern United States, U. S. Department of Agriculture, Division of Forestry, Bulletin 13. Section by F. Roth, p. 152. 1897.

[3] These trees were part of a group used in an investigation of naval-stores production by Austin Cary, logging engineer, and Eloise Gerry, senior microscopist, United States Forest Service, in cooperation with C. L. McCarthy, owner of the trees.

the material studied approximately 60 per cent of vertical resin passages were in the summerwood.

mong the negative results obtained were the fol- ing: Crown development bore no apparent rela- ship in this material to the number of vertical or form resin passages formed. No consistent differ- es in the number of vertical or horizontal resin sages as related to height in the tree were found, nor the average number per tangential inch of the 1912 ual ring show any significant difference from that of 1917 annual ring.

is believed that marked differences in the number esin passages might be found if extremely narrow xtremely wide annual rings were compared.

Portable Radio Sets for Forest Use

wo types of portable radio sets have been developed use by field forces of the Forest Service in 1932. smaller set is about 8 inches square and weighs than 10 pounds. It receives voice and transmits e, and will enable "smoke chasers" to communicate near-by lookouts or dispatchers. About one hour's ning is adequate to enable workmen to use it. The er set weighs about 25 pounds and transmits as well eceives voice. It also is easy to operate. It is ected to be of greatest use at lookouts, crew camps, other such stations. The "safe" radius of com- ication for each set is 10 miles. In practice the atherweight" set has transmitted code in level ntry to a distance of 100 miles, and the larger set transmitted voice 50 or 60 miles. The range of latter set can be extended by adding more batteries, to the maximum workable weight of 40 pounds.

xperimental work on the adaptation of radio to onal forest administrative purposes is being con- ed by A. G. Simson, of the Portland, Oreg., head- rters of the Forest Service.

◆

edwood planting data supplied to the California est Experiment Station by lumber companies and Mason & Stevens, consulting foresters, show that 5,000 trees have been planted on 25,500 acres at a of $225,000. The costs averaged $10.50 per acre Mendocino County and $7.32 per acre for Humboldt nty. Lumber company records show an average ival of 47 per cent. Survival and growth appear ave been best on north, east, and west exposures, on areas that were planted with 1–1 redwood stock in one year after logging.

Merger Abolishes Four National Forests

Under Executive orders recently signed by President Hoover, in the interest of more economical administration of national-forest land in Montana the number of national forests in that State has been reduced from 16 to 13. The lands formerly constituting the Madison, Missoula, and Beartooth National Forests have been distributed among other national forests, and some other boundary changes have been made. Similar action has been taken by the President respecting three of the national forests in the State of New Mexico. The Datil Forest has been abolished and the lands formerly included in it have been transferred to the Gila and Manzano National Forests. The name of the latter forest has been changed to "Cibola," commemorating the "Seven Cities of Cibola" which were sought by the early Spanish explorers and which were supposed to lie in the locality where this forest is situated.

By Executive order of February 25, 1932, the boundaries of the Bandelier National Monument, in the State of New Mexico, were slightly modified, and jurisdiction over this monument was transferred from the Forest Service of the Department of Agriculture to the National Park Service of the Department of the Interior.

Grazing Fees Reduced for 1932

Fees for grazing domestic livestock on the national forests during 1932 have been reduced by 50 per cent. In deciding on this reduction the Secretary of Agriculture was influenced by conditions facing stockmen as a result of the 1931 drought and of heavy snows during the winter of 1931–32 which compelled them to purchase unusual quantities of high-priced feeds. The order reducing the rates is effective for one year only.

In 1931 the charge for grazing cattle on the national forests averaged 14½ cents per head per month, for an average season of five and one-half months, and the corresponding fee for sheep averaged 4½ cents per head per month, for an average season of 3½ months.

More than 26,000 ranchers and stockmen will be directly benefited by this emergency action. Animals for which national-forest grazing fees were paid in 1931 totaled 1,375,467 cattle and horses and 6,707,328 sheep and goats.

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W. B. Rice, supervisor of the Payette National Forest, Idaho, recently visited 13 forest schools in the eastern half of the United States, at which he delivered a series of lectures on various phases of the work of the United States Forest Service. Such a lecture tour of the forest schools has been conducted by the Forest Service in each of six successive years. The six lecturers have represented, respectively, as many national-forest regions of the West.

ünch, E.: Naturwissenschaftliche Grundlagen der Kiefernharznut- . Biologischen Reichsanstalt für Land- und Forstwirtschaft, Bd. : 26. 1919.

General Forest News

Eddy Tree Breeding Station Carries on Under New Name

By Lloyd Austin, Institute of Forest Genetics

"Institute of Forest Genetics" is the name by which the Eddy Tree Breeding Station, at Placerville, Calif., will be known in the future. The new name is believed to be more expressive of the nature of the research work being carried on. Personnel and objectives of the institution remain as before.

Steps are being taken to insure the long-continued existence of the institute by providing for government by a self-perpetuating board of 15 trustees and by setting out to obtain a permanent endowment. Trustees are being elected from among men prominent not only in forestry but in allied sciences and in business.

The Institute of Forest Genetics is the only institution of its special kind in the world. A primary objective is to develop an improved, rapid-growing forest tree that will, on the better sites, attain a diameter of 16 inches and a height of from 70 to 80 feet in 25 years or less. The desired tree would have wood of good quality and would later be bred to have unusual resistance to insects, disease, and drought. Development of such a rapid-growing tree is expected to give great stimulus to reforestation by making it profitable and desirable for the individual landowner to grow timber as a crop.

Results achieved since the institute was established in 1925 indicate that this objective is entirely reasonable. Great differences have been found in the inherent vigor, or growth rates, of individual trees of the same species, and it is indicated that maturity of planted forests can be hastened considerably by scientific selection of seed sources alone. Twenty-seven thousand seedlings of 765 known ponderosa pine trees were grown under uniform conditions in one comprehensive test of inherent vigor.

Hybridization of species is another line of work being followed out by the institute. In this way it is often possible to bring about marked improvements in plants and animals. The hybridization experiments which the institute is carrying on with pines are the most extensive ever undertaken. Valuable new methods for artificial pollination and for vegetative reproduction have been worked out. For the first time, so far as is known, pines have been budded successfully.

For the present the institute is concentrating attention on the pines among softwoods and on walnuts among hardwoods. More than 100 species and important varieties of pines are growing in the arboretum at Placerville, a number greater than that of the famous pinetum of Kew Gardens.

The founder of the institute, and a member o
new board of trustees, is James G. Eddy, a Washi
lumberman who had the imagination to see in L
Burbank's achievements with domestic plants a
to the solution of the reforestation problem.

A Guide for Estimating Cull in Nort Hardwoods

A set of suggestions for estimating cull in nor
hardwoods has been formulated by Perley Spau
and G. H. Hepting, of the Bureau of Plant Indu
and M. Westveld, of the United States Forest Ser
as an outgrowth of studies carried out on the
River and Bartlett Experimental Forests on the W
Mountain National Forest, N. H., and of observa
in sawmills and on logging areas at Easton, N. H.
Wenlock, Vt. The investigators present as fo
certain characteristics of the principal fungi atta
northern hardwoods and their advice as to estim
cull where these fungi are present:

Fomes igniarius: Large, brown to black, w
fungus, brown beneath, usually entering thr
wounds. Fruiting bodies indicate serious loss, ext
ing 15 feet or more, in all species. Cull hea
Occurs on all hardwoods.

Fomes nigricans: Usually sterile, clinker-like, b
fungus. Causes open wounds with protruding, sw
edges on which the sterile black masses form.
heavily. Occurs on the birches.

Fomes connatus: Small, white, corky poly
usually with moss on the upper surface. Enters br
scars, bruises, or open seams. Rot extends but
2 feet up and down from the fruiting body.
average cull of 3 feet is sufficient. Occurs prim
on the maples.

Fomes applanatus: Large, flat, woody fungus
grayish upper surface and white lower surface w
blackens when scratched. Common as a wound p
site. Rot generally extends 4 to 6 feet in each direc
from the fruits.

Suggestions and observations applying to indivi
species of northern hardwoods are as follows:

Sugar maple: Cull lightly. Chief rot is *Fo*
connatus, for which average cull of 3 linear fee
sufficient. Fruiting bodies of *Fomes igniarius* indi
serious loss. Decayed knots are less serious tha
yellow birch. Seams generally go deeper than
yellow birch and require a deduction in the scale.

Open scars are often caused by maple-borer inj
If the dead wood in such scars is kept moist by ad
ing dead bark, rot is apt to enter. In such cases
several feet. If the dead wood of the scar is bare

' growth below the wound is cupped so as to hold er, cull 2 to 3 feet; if new growth below the wound ot cupped, cull only for mechanical injury.

OFT MAPLE: Cull heavily. *Fomes connatus* is frent; cull 3 feet each way from fruiting body. *Fomes arius* is common; cull very heavily, as fruiting bodies n complete loss in most cases. Swollen knots and ns are apt to indicate black heart if not rot.

ELLOW BIRCH: Cull moderately. Butt rots require rage cull of 3 feet at the mill. *Fomes igniarius* is mon; cull 50 to 100 per cent.

pen cankers with depressed center and swollen es upon which irregular, black, clinker-like, rather tle masses occur indicate 50 to 100 per cent loss. ayed knots are more serious than in sugar maple. ms seldom require a discount unless they fold ard.

APER BIRCH: Cull moderately. *Fomes igniarius* ts mean nearly total loss. Open, depressed cankers n black center or edges mean heavy loss; cull 75 cent or more.

EECH: *Fomes igniarius* is common and causes 50 to per cent loss. One fruiting body on lower trunk n large rotten knot or stub on upper trunk indicates l loss. For *Fomes applanatus*, cull 4 to 6 feet from fruits. Rot in beech is extremely deceptive; ex- t in the case of *Fomes igniarius*, it starts and ends uptly. In stands where *Fomes igniarius* is plentiful, ns with rough, swollen knots should be culled even ugh no conks are in evidence.

tudies and observations showed that old logging s, porcupine work, open seams, etc., if they extend he ground so as to be kept moist and open enough ready entry of air, require a cull of from 6 to 8 feet. hey are located 6 inches or more above the ground so remain dry, no cull is needed except for the hanical injury. Wet wounds which the air can enter freely often remain unrotted.

utt rot is more serious if it starts at or below ground l than if it starts above ground level. Quantity of rior defect is proportional to size of defective surface ts. A churn-butted tree is not invariably one af- ed by butt rot. Hardwood timber growing in low, places is apt to be pretty defective, while hardwoods vell-drained soils are generally fairly sound. Hard- d stands that have been heavily culled for spruce fir are more defective than stands from which only a ligible portion of the softwood timber has been oved.

* * *

orthern white pines in Carrol County, N. H., have n left practically untouched by porcupines that e girdled large numbers of softwoods of other ies intermixed with the white pines or growing by, writes Blister Rust Control Agent S. H. omer. The trees for which the porcupines showed erence were Norway pine, Scotch pine, fir, and ice.

Forest Insects in 1931

(From the Insect Pest Survey, published by the United States Bureau of Entomology)

Less defoliation was caused by the gipsy moth (*Porthetria dispar L.*) in the summer of 1931 than for several years, and in most of the infested area the trees were practically free from gipsy-moth feeding. Defoliation was severe in the counties of Bristol, Plymouth, and Barnstable, Mass. Areas in New England that were recorded as showing some feeding by the gipsy moth caterpillars totaled 204,720 acres. More than half of this, however, was classified as less than 10 per cent defoliated, and of the remainder more than half (54,710 acres) was in the southeastern section of Massachusetts. The New York Conservation Department found no infestation of the gipsy moth on Long Island in 1930 and 1931, except in the towns of North Hempstead and Oyster Bay. In the former, 110 egg clusters were discovered in 17 infested localities; in the latter, 67 were found in 24 infested localities. Practically all these infestations were in woodland. During the first half of 1931, no gipsy-moth infestation was found in the portion of the barrier-zone area in Vermont that was scouted. Early in July, 1931, a scattered infestation was found in Colebrook, Conn., near the Massachusetts State line. Numerous infestations, many of them in woodland, have existed during the past two years in a group of towns including Sandisfield and New Marlboro, Mass., and North Canaan, Canaan, and Norfolk, Conn. Beyond the New York barrier zone infestations were somewhat fewer than during the previous fiscal year and marked progress was indicated in cleaning up infested locations. No new gipsy-moth infestation has been found in New Jersey since May, 1929. The southern half of Bridgewater Township and the northern half of Hillsboro Township have been examined with special care, as this area was the most heavily infested when the insect was first found in New Jersey.

The brown-tail moth (*Nygmia phæorrhœa* Don.) has not been found outside the regulated area this year.

During 1931 the satin moth (*Stilpnotia salicis* L.) was found in new localities in the following counties and quarantine regulations were modified to cover the additional areas: Piscataquis, Somerset, and Franklin Counties, Me.; Orange County, Vt.; Berkshire and Franklin Counties, Mass.; and Hartford, Litchfield, New Haven, and Fairfield Counties, Conn.

The forest tent caterpillar (*Malacosoma disstria* Hbn.) was generally reported from the New England and the northern Middle Atlantic States as very scarce. Late in April the insect was active and abundant in Alabama and Louisiana. In Louisiana, after defoliating the sweet gum and willow it attacked oak and wild blackberries and also inflicted considerable injury on strawberries by eating the flowers. During May several hundred acres of forest land in Fluvanna County, Va., were completely defoliated. A similar outbreak occurred in Buckingham County, Va. These were said to be the worst outbreaks of this insect ever experienced in that State. From June 10 to June 20 the moths were so numerous in the streets of Lynchburg and Roanoke, Va., that merchants were forced to turn out their window lights. Adults were observed early in May in large numbers at Orlando, Fla. During June some defoilation was reported from Hancock County, Me. The eastern tent caterpillar (*Malacosoma americana* Fab.) on the whole was not abnormally numerous in 1931 throughout the New England, Middle Atlantic, and South Atlantic States. On the other hand, reports of unusual numbers of this insect were received from Arkansas and Texas. During the late spring it was reported as defoliating trees, especially wild black cherry, in parts of southern Maine and was also recorded as abundant in restricted localities in the other New England States. The California tent caterpillar (*M. californicus* Pack.) was extremely prevalent in late March around Phoenix, Ariz., where it was defoliating cottonwoods and severely injuring apricot foliage.

The western tent caterpillar (*Malacosoma pluvialis* Dyar.) was again abundant on alder, poplars, and willow along the coast of Oregon and the Columbia River. Defoliation of these trees was not so severe as in 1930, however, and only in a few places were trees completely stripped.

Adults of the saddled prominent (*Heterocampa guttivitta* Walk.) issued in the New England area during May and early June. Eggs hatched in the Berkshire Hills of Massachusetts on June 10 and in the White Mountains of New Hampshire on June 16. This insect, which was at the peak of its abundance in 1930, is still numerous throughout western Massachusetts, southern Vermont, and New Hampshire. For the greater part the defoliation was confined to maple and beech.

The bagworm (*Thyridopteryx ephemeræformis* Haw.) was reported as very abundant on arborvitae in George County, Miss., in February. In June the insect was reported from Columbus, Ohio. During July reports were received of serious damage to evergreens in Vermont, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, and Ohio. The bagworm was quite generally reported during August from New York westward to Indiana and Kansas, and southward to Mississippi and Florida. Reports continued to come in during September from this same general area.

The mountain pine beetle (*Dendroctonus monticolæ* Hopk.), which has been sweeping through all the lodgepole and western white pine stands of the Pacific Northwest, is now decreasing in many sections, owing largely to a lack of suitable host material. The most serious epidemic in California is in the Medicine Lake district of the Shasta National Forest. There is evidence of a decided increase in some stands of sugar pine in the Sierra Nevadas. In Oregon and Washington epidemics were noted during the year on the Fremont, Crater, and Deschutes National Forests, on the Klamath Indian Reservation, and throughout the Cascades of Washington. The outbreak in M Rainier National Park was completely under cont 1931. Increased losses occurred during the throughout the lodgepole pine forests of Montan Idaho; on the Beaverhead National Forest alone than 12,000,000 trees were destroyed. There wa a marked increase in losses in Yellowstone Na Park. In central Idaho the infestation has s throughout the Salmon, Challis, Payette, Weiser Idaho National Forests and is now moving north Similar outbreaks continued to ravage the pine f on the Kaniksu and Pend Oreille National Forest

In general, western pine beetle (*Dendroctonus comis*) infestation is not intensifying materially. L as high as 8 per cent of the stand were observed, ever, along the western slopes of the Sierra Nevad the Sierra, Stanislaus, and Sequoia National Fo Calif. Losses were particularly heavy in Oregon o Fremont, Deschutes, Ochoco, and Malheur Nat Forests, the Klamath Indian Reservation, and private timberlands adjacent to these areas. In s ern Oregon the infestation is increasing and reache 4 per cent of the timber stand in 1931, while o Ochoco and Malheur areas timber losses from cause ran from 5 to 7 per cent. It is estimated approximately 600,000,000 board feet of pond pine was killed by this beetle during the year throug Oregon and Washington.

The southern pine beetle (*D. frontalis* Zimm.) exceedingly scarce throughout the forests in the S eastern States. This situation was believed to be to the nearly complete natural control of the b during the late fall and winter of 1930–31, bro about largely through abnormally high tempera and (to a lesser extent) through the activities of b particularly woodpeckers. As a result of high tem atures during October and November of 1930, br that would normally have overwintered in the la pupal, and adult stages matured and emerged in fall. A large percentage of these broods were destr by woodpeckers as they reached the mature larval pupal, and the callow adult stages. Insects emerged and escaped the woodpeckers attacked t but were unable successfully to establish brood them so late in the season. The only activity n during 1931 was in the vicinity of Asheville, N. where the rainfall deficiency continued to be somev greater than in surrounding noninfested areas. N Asheville several spot outbreaks occurred, becon more noticeable in the late summer and fall month

Pine shoot moths (*Rhyacionia* spp.) are causing c siderable concern in the Northeastern States as ser pests to cultivated conifers, particularly nursery st upon which they destroy the terminals. Report serious damage to Scotch pine (*Pinus sylvest* Norway pine (*Pinus resinosa*), mugho pine (*P montana mughus*), Austrian pine (*P. nigra*), and o species of pine nursery stock in Pennsylvania, an the vicinity of New Haven, Conn., and the metro district of Boston, Mass., by *Rhyacionia buoliana* ff., were received. *Rhyacionia frustrana* Scudd. ared in large numbers in a plantation of pitch pine *rigida*) during August at Cheyney, Pa., and also sioned considerable injury to young "spruce pine" *ga canadensis*) at Laurel, Miss. A new species of shoot moth (*Eucosoma gloriola*) described by nrich[5] was found to be quite generally abundant year in the lateral shoots of northern white pine *strobus*) at North Stamford, Conn. During 1931 it sufficiently numerous at some places to cause eciable injury. The moths from the type material rged during the early part of May, 1931, from larvæ cted by E. P. Felt during early July, 1930.

he first adults of the spruce budworm (*Harmologa ferana* Clem.) of 1931 were observed at Fargo, Dak., on June 17. This insect defoliated balsam nd several species of pine over large areas in Wisin and North Dakota. During early July, on s in Wisconsin that in some cases covered entire nships practically every tree was completely deted. An outbreak of this insect was first recorded ody Canyon, Shoshone National Forest, Wyo., in , and since that time has spread over a tremendous age and destroyed large quantities of Douglas fir; outbreak decreased somewhat in severity during . As a result of an outbreak on the Ochoco onal Forest, Oreg., extensive stands of white fir, glas fir, and larch are dead and dying.

he hemlock looper (*Ellopia fiscellaria* Guen., var. *brosa* Hulst) during the past three years has built tremendous epidemic in Pacific and Grays Harbor nties of Washington. It is estimated that during this insect killed 90,000,000 board feet of hemlock, some western red cedar and Sitka spruce, in Pa- County, and 10,000,000 board feet in Grays bor County. A total of 162,000,000 board feet been killed in Pacific County during the three s of the epidemic.

he larch case bearer (*Coleophora laricella* Hbn.) was rted as severely damaging extensive stands of h in Maine, Vermont, Massachusetts, and Pennania. In three counties in Maine the insect defoli- from 50 to 100 per cent of every stand of larch. damage continued into June, when reports of age were coming also from Massachusetts, New k, and New Hampshire. A late brood of this ct defoliated larch in September in New York.

rches were very severely attacked by the birch etonizer (*Bucculatrix canadensisella* Chamb.) during late summer and early fall in Maine, New Hampe, Vermont, New York, Wisconsin, and Minnesota. many places in the Adirondacks of New York State birches were completely defoliated. In northern ne hundreds of thousands of acres of birch were vned by this insect. The birch leaf-mining sawfly (*Phyllotoma nemorata* Fall.) was associated with *B. canadensisella* throughout the New England area and New York.

The leaf roller *Cacœcia conflictana* Walk. has been known for a good many years as a poplar pest in western Canada, but seems to be a comparatively new pest in the United States. In 1931 we received a report of approximately 43,000 acres of poplar being defoliated in the Moosehead Lake district in Maine. The adults were in flight the last week in June and by the middle of July another brood of larvae were feeding on the poplars.

Overwintering adults of the elm leaf beetle (*Galerucella xanthomelæna* Schrank) were abundant in late April at Narragansett, R. I., and during the latter part of June eggs and small grubs were very numerous in southern New England. Indications of the work of this insect were also observed during June in West Virginia, and it was reported as very abundant at Jackson and Lexington, Oreg. During July it was quite generally reported from New Hampshire southward along the Atlantic seaboard to Maryland, with occasional outbreaks in Ohio and Kentucky. Early in the spring of 1931 this beetle was recorded for the first time in Yosemite National Park, Calif., and late in the season a report was received that it was spreading rapidly in many parts of California.

In April of 1931 the beech scale (*Cryptococcus fagi* Bar.) was found in the vicinity of Boston, Mass. A preliminary survey disclosed its presence in three distinct areas: One between Augusta and Belfast in Maine, another including Gloucester, Essex, Manchester, and Beverly in northeastern Massachusetts, and a third including the Boston district. As far as is known this insect limits its attack to beech, of both the American and the European species. It is believed, both in Europe and in Canada, that the slime flux often associated with the insect is more dangerous to the trees than the scale itself. This insect is recorded as prevalent in the Maritime Provinces of Canada.

During the year 654 cases of damage by termites (Isoptera) were brought to the attention of the Bureau of Entomology. These cases were scattered over 36 States, the District of Columbia, the Philippine Islands, and Hawaii.

◆

New evidence as to the water-holding function of forest litter and leaf mold has been brought out by an experiment at the Guthrie, Okla., soil-erosion station of the Bureau of Chemistry and Soils. Two adjoining plots of virgin post oak woodland were put under control, both having the same soil, slope, and vegetative cover. One plot was burned over, the other was left undisturbed. During a 9-month period 28,250 gallons of water per acre were lost by run-off from the burned area, while only 338 gallons per acre were so lost from the unburned area.

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roceedings of the Entomological Society of Washington, vol. 23, p. 196, Nov. 23, 1931.

A Soil-Saving Cultivator

A soil-saving cultivator has been developed experimentally by the Bureau of Chemistry and Soils, among the possible uses of which is the preparation of eroding lands for forest planting. The novel feature of this implement is a set of alternating shovels which work up and down in such a way that as the machine moves forward it leaves behind it rows of holes alternating with piles of soil. As now constructed the machine makes approximately 10,000 holes to the acre, each hole having a capacity of from 2 to 3 gallons. These holes collectively impound a large quantity of water, and by holding it still enable it to soak into the ground. The overflow from the holes must zigzag around the piles of soil, with the result that the rate of run-off is slowed down and absorption is increased. A set of regular cultivator shovels precede the digging shovels. The furrows which they create are destroyed by the digging shovels. It appears that the surface condition produced when the machine is run up and down hill should be as effective in conserving water as that produced when operation follows the contours.

The McCubbin Gum Tree

A 42-year-old gum tree of the species *Eucalyptus viminalis* on the property of J. C. McCubbin, 3 miles west of Dinuba, in Tulare County, Calif., is 131 feet tall and has a girth of 22 feet 10 inches at a height of 3 feet from the ground. The girth at the ground is 30 feet 8 inches, and the spread of the crown is 123 feet.

The owner relates that he obtained this tree in the spring of 1889 as one of 100 to be used in planting a grove. While awaiting planting the boxful of trees spent a day in a corner of a barn. During that time a hen, choosing the box as a nesting place, scratched some of the trees out by the roots and thrashed the tops out of several others. The tree that has now made such a growth record was one of those beheaded by the hen. Rejected for use in planting the grove, it has grown up in the open.

Before the tree was planted, about 8 or 10 inches of highly fertilized soil from an old sheep corral was used to raise the level of the planting site to that desired in connection with an irrigation scheme. Aside from this, no fertilizer has been used.

◆

Percolation of water through soil is governed by the presence of holes, cracks, and crevices, irrespective of their origin, to a much greater extent than by the mechanical composition of the soil, according to findings of the Bureau of Chemistry and Soils. The capacity of the soil to disperse in water and to fill such cracks is the most important factor in regulating the rate of water percolation through soils.

International Research Union Has Members

Ordinary members of the International Unic Forest Research Organizations numbered 85 at beginning of 1932, 31 new members having beer mitted during the preceding year. The union nov members in 31 different countries. It will hold a gress in Nancy, France, September 4–11, 1932. section of forest entomology will meet at Nancy dı the second half of July, following the Fifth Internat Congress of Entomology, at Paris.)

The work of the union's bibliographical comm has been interrupted by the death of the chairma the committee, A. Opperman, of Denmark. Of nine members of the committee formed to repor actual methods of laying out and measuring sa plots, the French and Prussian have already deliv reports and the others have promised to present reports before the 1932 congress. Committee rej are expected also on standardized descriptio forest stands, nomenclature of humus forms, entomology. In pursuance of the union's desir facilitate international exchange of forest seed of kr origin the secretary general publishes an incom list of kinds of seed which members of the union be able to deliver. Even in poor seed years he has fairly successful, he reports, in providing members the kinds of seed that they have requested.

◆

The bark and wood of young Chinese chestnut grown at Bell, Md., have been found by the Burea Chemistry and Soils to have practically the same ta content as the bark and wood of near-by second-gr American chestnut trees of the same age. A samp Florida mangrove bark submitted to the bureau found to contain, on the moisture-free basis, 26 per tannin and 13.5 per cent nontannins. This ta content is about 10 per cent less than that of the ported mangrove bark.

◆

A special fire problem of the redwood distri involved in the fact that when redwoods are cut immense trunks are difficult to handle and it is n sary to burn the slash before the logs can be remo The slash must be dry in order to burn, but the bur should take place immediately before a rain. Eureka, Calif., office of the Weather Bureau endea to assist lumber companies in the district by predi when weather conditions will be suitable for bur slash.

◆

The Forestry Branch of the Indian Service rej completion of an extensive grazing reconnaiss covering 45,000,000 acres of Indian lands.

Foreign Notes

onomy Program Scales Down British Afforestation Plan

reat Britain's economy program, approved by iament in September, 1931, cut practically in half expected appropriations to the forestry commission 932 and subsequent years of the decade beginning October, 1929. Under the previously existing y, appropriations to the commission during that de would have totaled £9,000,000. The de- se in the 1932 appropriation is £478,000. Acquisi- of land was to have proceeded at the annual rate of 00 acres of plantable land and 2,500 acres of vable land, the latter to provide for additional t workers' holdings. Planting operations, which red 24,721 acres in the year ending with September, , were to have been "stepped up" to 44,000 acres ar by 1938. It is anticipated that under the new ram afforestation will be restricted to 20,000 acres year and to land already acquired.

n the basis of calculations made by the forestry nission the select committee on estimates reported 929 that about three-fifths of the commission's nditure might in certain circumstances be expected ield a net return of as much as 3.7 per cent, but the remaining two-fifths would yield a small 'n or none. Spread over the whole operation, returns would average from 2 to 2½ per cent. committee that formulated the Government's omy program held that as an investment of the onal resources an estimated return of from 2 to per cent "has no attractions." As against the pect of higher prices for timber "in the remote e" it urged the probability of the development of titutes for timber and of forestry development in s where it can be carried out more cheaply than reat Britain. Considering afforestation as a means ttling the unemployed on the land, the committee d that to find full-time work for one man in this costs £140 per annum and that the capital cost roviding a forest worker's holding whereon a man find part-time employment to supplement his work e forest is estimated at from £400 to £600.

ie minority of the committee reported in part as ws:

> is is particularly one of those forms of develop- which must necessarily be done by the State if us attention is to be given to it at all. Its value not be judged from a purely commercial stand- t, and the commissioners have ample justification he attitude they have adopted toward their func- when they state that "the object of afforestation t to provide a remunerative investment for State s but to meet certain deficiencies in the economic nization of the country which otherwise would not ade good."
>
> It was represented to the committee that one of the considerations in mind when the present scheme was started was the bulky nature of timber as an import and its consequent heavy demands on tonnage. As a factor to be taken into account in the event of war, the necessity to import timber would be a serious consideration * * *.
>
> Another important feature is that excessive forest depletion is at present going on in most parts of the world without adequate replacement by new planting * * *. In Great Britain, with the break-up of estates, woods are being felled and not replanted. That process is likely to be accelerated and the work of the commission remained as one of the few efforts to reconstitute rural Britain.
>
> The commission are obtaining land on favorable terms and they do not anticipate that there is any prospect of a further fall in value * * *.
>
> * * * The recommendations in the main report would, it appears, involve the gradual abandonment of any considered forest policy * * *. It must not be overlooked that this country imports timber products to a value of between £40,000,000 and £50,000,000 per annum, a large amount of which is finished material.

Sir Roy Robinson, the technical commissioner of the forestry commission, has stated that despite the curtailment of the program he will be able to maintain the integrity of his personnel and the continuity of the research work.

Corsican Pine Thrives on Poor Soils in Belgium

Corsican pine is giving promising results in Belgium, where it was introduced 40 years ago, writes Egide Rosseels in the Bulletin de la Société Centrale Forestière de Belgique. It accommodates itself to poor soils formerly devoted solely to Scotch pine, and grows well on such soils. In the forest of Couckelaere some Corsican pines were planted on sandy soil in 1882. At the age of 47 years, when they numbered 224 to the hectare, these trees had a volume of 335 cubic meters per hectare. This corresponds to an average annual growth of more than 7 cubic meters, aside from the thinnings made in the meanwhile. The circumferences of the trees at a height of 1½ meters varied from 75 to 190 centimeters. The heights varied from 16 to 20 meters.

On private property in Holland near the Belgian frontier there are several stands of Corsican pine of which the oldest, aged 40 years, has a volume of 440 cubic meters per hectare.

This species has an incontestable advantage over Scotch pine in the eyes of Belgian timber growers, observes M. Rosseels, in that its stem is absolutely straight. This is of special importance because in sales of timber for use in mines every curvature of the stem, however unpronounced, lowers the returns.

Corsican pine can not usually be grown in Belgium at elevations greater than 300 meters.

Progress of Elm Disease in Great Britain

A fourth annual survey to determine the spread of the Dutch elm disease in Great Britain disclosed in the fall of 1931 that the disease had attacked trees in Monmouth, Huntingdon, and Lincoln. With these additions, the counties in which the disease has been discovered now number 33. The disease has not been discovered anywhere in Scotland, and the area known to be infected in Wales is very small. In both those countries elms are relatively scarce and are separated by wide tracts of moorland. The districts most severely infected are Essex and the eastern part of Suffolk. This suggests to the forestry commission that the disease is favored by a climate drier than that of other parts of England.

The forestry commission is quoted as stating that "there is nothing to justify the fear that within some measureable space of time all our elms are going to be killed," and mentioning evidence that outside the districts where the disease is epidemic occasional trees recover. The commission has thought best not to go to the expense of undertaking any research on the disease, since intensive studies are in progress in Holland, France, and Germany.

Great Britain Trains Forest Apprentices

By Arthur C. Ringland, United States Foreign Agricultural Service

The British Forestry Commission maintains two schools for the training of forest apprentices—one at the Forest of Dean, for England and Wales, and one at Benmore Forest, for Scotland. Both schools are ideally situated and well housed, and have every facility for training in theory and practice and for demonstration and experimental work.

The Benmore school is located within a forest area of 11,000 acres in the rugged highlands of Argyllshire that was donated to the forestry commission in 1925. Formerly used for pasturing sheep, since 1870 the area has undergone successful afforestation. Some of the plantations now have almost the appearance of natural forest, particularly the Sitka spruce and the Douglas fir. The approach to the school building, formerly a manor house in the baronial style, is through a magnificent avenue of sequoias now reaching a height of more than 100 feet and having diameters of perhaps 40 inches.

The Forest of Dean is a 19,000-acre tract of Crown property of which 16,000 acres is wooded and under forest management and the remainder consists in open grazing ground subject to common rights. This is one of the more extensive remnants of the forests that once covered the greater part of Great Britain. In the days of the Normans it was a royal hunting forest. Here the forestry commission now has under intensive management stands of oak planted 100 to 120 years ago but badly neglected until 1896, when for the first time the forest was put under a sort of working plan. These stands, supplemented by extensive plantings of both hardwoods and conifers recently e lished by the commission and by four series of e mental plantations under the direction of the research officer, afford unusual opportunities t students of the Dean school.

In each of the schools the course of training emb theory and practice and covers a period of two with but a short vacation. First-year work inc surveying; leveling; field and office mensuration; bo pathology; nursery work; entomology; identific of trees, grasses, and seeds; and forest work incl clearing, planting, fencing, draining, afterca plantations, etc. Second-year subjects include geo meteorology, nursery work, silviculture, natural r eration, thinning, mensuration, forest protection, lization of timber, forest management, etc.

Appointments to the schools are eagerly so At Benmore, with an enrollment of 24, approxim 12 appointments are available each year. At Dea enrollment this year is 37. Applicants must b tween the ages of 19 and 25. Selection is base previous experience in practical forestry work an the outcome of written and oral examinations desi to determine educational preparation and per fitness. A medical certificate of physical soundn demanded.

There is no charge for this training. Apprentice provided with free board, lodging, fuel, and light, a money allowance of 10 shillings per week throug the course. At the end of the first year a bonus a rate of 2 shillings per week is paid to apprentices w progress and conduct have been satisfactory and undertake to attend the prescribed course for the se year. At the end of the second year a bonus at rate of 3 shillings per week is paid if conduct and pro have continued to be satisfactory. While atten school the apprentices are required to wear unifor

Examinations are given periodically. Students pass their examinations satisfactorily receive ce cates of graduation.

While the forestry commission does not guara employment upon completion of the course, mo the men are recruited into the civil service. For year they have charge of working crews and are kn as "gangers." Men who prove capable may the promoted to positions as foremen, and after three y are eligible to be rated "foresters second gra They may progress to the highest positions in forestry organization.

* * *

A wood specimen found in Norway in which pression wood was arranged in a spiral of at least t laps led E. Mork to the theory that compression w instead of resulting from compression on the u side of leaning branches and stems, is itself the c of the leaning—a formation "which arises to bring plant organism into balance with the geotropic for This theory was presented under the title "Om Ten in Bilag til Tidsskrift for Skogbruk, 9 (1928).

Personals

an F. Eldredge is reentering the United States t Service as regional director of the Forest Survey South, after six years as manager of the 200,000- rivately owned Suwannee Forest, at Fargo, Ga. g the first half of his 16-year connection with the t Service, beginning in 1909, Mr. Eldredge was visor of the Choctawhatchee and Ocala National ts, in Florida. Later he was an inspector in the h of Forest Management of the Washington, , office of the service. As regional director of the t Survey he will have headquarters at New ns.

ald Bruce has left the Division of Silvics, United Forest Service, to devote his entire time to work e consulting forestry firm Mason & Stevens. ruce previously resigned from the Forest Service, ervisor of the Flathead National Forest, Mont., 5, to join the forestry faculty of the University lifornia. He left the university to return to the t Service in 1924. For several years he has di- his time between the Forest Service and Mason vens.

vood Wilson, forester for the Laurentide Paper Quebec, has been appointed professor of silvi- e at Cornell University as successor to Samuel N. , newly appointed assistant dean of the New State College of Forestry. Mr. Wilson has been ger of the forestry division of the Laurentide Co. 1905. He was educated in the United States Europe and has had forestry experience in the .

. Bode has resigned as extension forester of Iowa ome secretary to the Iowa Fish and Game Com- n. He is succeeded by Sylvan Runkel, a 1930 ate of the Iowa State College.

es M. Mallory, for several years industrial agent Central of Georgia Railway, has been appointed Georgia Commission of Forestry and Geological opment to serve for a period of six years.

ter H. Reineke has been transferred from the rnia Forest Experiment Station to the North- Forest Experiment Station, as a silviculturist lizing in mensuration. Mr. Reineke has com- the requirements for the M. F. degree from the rsity of California.

ald N. Matthews, who has had charge of Forest activities on the national forests of the North Region, will soon conclude that work and will ransfer to the Pacific Northwest Forest Experi- Station to assist Richard E. McArdle in fire ch. Mr. Matthews was formerly assistant visor of the Umpqua National Forest, Oreg.

Ralph S. Hosmer, head of the forestry department of Cornell University, has been elected a fellow of the Society of American Foresters. Professor Hosmer is the thirteenth member of the society to receive this honor.

Members recently appointed by the Secretary of Agriculture to the forest research advisory councils of four forest regions are as follows: Allegheny—Ezra B. Whitman, engineer, Baltimore, Md.; Lewis E. Staley, secretary, Pennsylvania Department of Forests and Waters; and E. S. Cary, manager, Pocono Lake Preserve, Moorestown, N. J.: Pacific Northwest—Ossian Anderson, president, Puget Sound Pulp & Timber Co., Everett, Wash.; N. C. Jamison, manager, Sauk River Timber Co., Everett, Wash.; John Woods, forester, Long-Bell Lumber Co., Longview, Wash.; and Paul Neils, manager, Mount Adams Pine Co., Portland, Oreg.: Central States—Alexander W. Thomson, president, Champion Coated Paper Co., Hamilton, Ohio: Appalachian—B. L. Roberts, forester, Cherry River Boom & Lumber Co., Richwood, W. Va.; and T. G. Woolford, Retail Credit Co., Atlanta, Ga.

W. J. Keays, formerly engineer with the War Department, has been appointed associate forest engineer in the Forestry Branch of the Indian Service and assigned to highway construction.

Frederick Erskine Bronson, president and managing director of the Bronson Co., Ottawa, is president of the Canadian Forestry Association for 1932. Robson Black is vice president.

Frank B. Lenzie has been appointed range supervisor in the Forestry Branch of the Indian Service, United States Department of the Interior. Mr. Lenzie resigned seven years ago from the United States Forest Service, leaving a range management position in the North Pacific Region.

E. G. Wiesehuegel, assistant professor of forestry in Ohio State University, is president of the Ohio Forestry Association for the present year. F. W. Dean, extension forester, is secretary-treasurer. Willis M. Baker, director of the Central States Forest Experiment Station, has been made a member of the executive council.

W. C. Bramble, a 1929 forestry graduate of the Pennsylvania State College who has done graduate work in forest pathology at Yale, has been awarded a National Research fellowship in forestry, for study in the United States.

L. T. Pierce, of the United States Weather Bureau, is now stationed at Asheville, N. C., as a forest fire weather forecaster. The region which he will serve includes southern Virginia, eastern Tennessee, western North Carolina, and northern Georgia.

Bibliography

Old-Growth Forests of Southeastern Europe

By PAUL W. STICKEL, United States Forest Service

In his volume Aufbau, Wuchs und Verjüngung der Südosteuropäischen Urwälder,[6] Karl M. Müller has presented conclusions regarding the silviculture of the primeval forests of Bulgaria that should be of interest to all American foresters interested in the succession of types in virgin forests and concerned with the problem of bringing about natural regeneration of pure coniferous stands. This excellent publication should have a particular appeal to western foresters because of the similarity in floristic and ecological conditions between southern Bulgaria and the western United States. It is a European counterpart of the pyroecological studies of Clements (*1*) and Show and Kotok (*2*) in the United States. Müller's studies have indicated that in the pine forests of southeastern Europe fire has an unquestionable place as a legitimate silvicultural agent.

The investigations reported in this volume have to do with the forest vegetation of the Rhodope, Prin, and Rilo Mountains, in south-central and southeastern Bulgaria. The topography of these Bulgarian highlands is rugged and steep; the Rilo Range has 12 peaks with elevations of 9,000 feet or more, of which the tallest—Mus Allah—reaches 9,589 feet. Being of volcanic origin, the rocks are formed largely of gneisses, crystalline schists, and granite. Although Bulgaria is essentially a semiarid region its mountains have an annual precipitation of between 25 and 40 inches (varying according to altitude), which is sufficient to maintain several large rivers such as the Struma, Mesta, and Marista. Southern Bulgaria can be characterized as a typical dry-autumn region, less than 20 per cent of the annual rainfall occurring during the autumn months. Spring is the period of greatest rainfall, with more than 30 per cent. High maximum temperatures occur during the period of minimum precipitation.

As in other mountain regions, the forest types follow distinct altitudinal zonations. The distribution of the forest vegetation of the Rhodope Mountains may be used as a criterion for the entire region. In the Rhodope Mountains six distinct types occur:

1. Oak scrub type, restricted to the foothills at elevations of 1,600 to 2,600 feet. Forms a typical brush forest caused primarily by repeated fires and overgrazing. The principal tree species are the European Turkey oak (*Quercus cerris*), durmast oak (*Q. sessiliflora*), and pubescent oak (*Q. lanuginosa*, syn. *Q. pubescens*).

2. Austrian pine (*Pinus nigra*) type, found b
2,600 and 3,900 feet. Not so much the prod
altitudinal influences as of variations in geo
formations. Austrian pine is confined to
isolated lime formations upon which it form
stands.

3. European beech (*Fagus sylvatica*) type, cc
to the lower slopes of the mountains at elevati
3,900 to 5,000 feet. In general the trees hav
poor form that the stands have all the characteris
a coppice forest.

4. Scotch pine (*P. sylvestris*) type, found at alt
of 5,000 to 5,600 feet. Occurs generally in
stands. Where soil moisture conditions are
propitious, however, Norway spruce (*Picea abie*
P. excelsa) is admixed with the pine. Beech is
ing from these pine stands because of advers
conditions.

5. Norway spruce type, extending from the
edge of the Scotch pine type (5,600 feet) to 6,20
Mainly pure except in dense stands on moist
where European silver fir (*Abies alba*, syn. *A. pec*
is found associated with spruce.

6. Subalpine mixed type. Above 6,200 fe
dense closure of the Norway spruce type is lost, a
stands have a parklike appearance typical of
mountain forests. The spruces are open grow
poor stem form. Above 6,600 feet the mo
juniper (*Juniperus communis montana*, syn. *J.*
forms a typical alpine brush type with scat
weather-beaten spruces. The type extends to
6,900 feet.

7. The following species are found up to about
feet, but do not form distinct permanent
European aspen (*Populus tremula*), European
birch (*Betula alba*, syn. *B. pubescens*), and gray
(*Salix cinerea*).

In the Prin region occur four pine types, tw
careous and two noncalcareous. In addition
Austrian pine type found between 3,000 and
feet there is a graybark pine (*P. leucodermis*) type
ing as small pure stands on soils rich in lime at
tions of from 5,000 to 6,600 feet. The noncalc
pine types, Macedonian pine (*P. peuce*) and
pine (*P. montana mughus*), are found at altitu
5,200 to 6,200 feet and 6,600 to 7,300 feet, respect
Furthermore the Norway spruce type occurs at
lower elevations than in the Rhodope Mountains,
found at 3,900 to 5,000 feet.

Except for the occurrence of the Norway s
European silver fir type at 5,000 to 5,900 feet and
Macedonian pine and mountain pine types at 5,
6,600 feet and 6,600 to 7,300 feet, respectivel
floristic composition and zonal distribution of ty
the Rilo Mountains are similar to those listed f
Rhodope area.

Although these Bulgarian mountain forests a
old as compared with the virgin forests of the w
United States, a 250-year age class being the
cited by Müller, they are essentially primeval
lands because the stands have never been subject
commercial exploitation. These forests are stil
natural home of a nomadic primitive people

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[6] Aufbau, Wuchs und Verjüngung der Südosteuropäischen Urwälder: Eine waldbauliche Studie über den Urwald unserer Zone überhaupt. (Composition, growth, and regeneration of the primeval forests of southeastern Europe: A silvicultural study of the primeval forest of our zone.) 323 pp. M. & H. Schaper, Hannover, 1929.

ipal occupations are hunting, fishing, and grazing. e the utilization demands of these forest inhabit- have produced no marked changes in the natural ation, their activities have had a very pronounced nce. Fires set by the herders for improving re facilities, as well as fires set by lightning and formerly set by the Turks for strategic purposes, led to a regular succession of species through ges in seed-bed conditions. Fire is the principal mic factor causing an alteration of composition in ulgarian forests.

r the purpose of outlining the succession Müller isted the major tree species in three ecological ps: Light-demanding trees, half-shade trees, and hade trees. Scotch and mugho pines and aspen ssentially light-demanding species. To the group lf-shade species belong such trees as the Austrian, bark, and Macedonian pines. Full-shade species epresented by beech and Norway spruce. Müller narizes the optimum climatic and edaphic conditions for these three groups as follows:

	Light-demanding species	Half-shade species	Full-shade species
tic optimum	Arid	Transition	Humid.
ic optimum l bed).	Mineral and burned-over soil.	do	Duff and humus

nd and fire are the only major catastrophies that te on a broad scale the cycle of succession in these eval woodlands. Save where special site factors perative, such as high lime content in the soil, is a normal cycle from light-demanding species igh half-shade to full-shade species. For example, fire sweeps through a climax full-shade stand of vay spruce the bare mineral soil is quickly seeded cotch pine, for which the site is now optimum. e does not revisit the area until the cycle is com- the pure pine stand, by creating less xerophytic conditions, slowly prepares the way for its own cement. Particularly do the pines improve hic conditions by the formation of a humus soil r. In time spruces gradually invade the pure pine l, so that for a while a mixed forest of pine and e exists. Imperceptibly but surely, as conditions me more mesophytic and the humus layer is built he pines are crowded out by the spruces until once there results a pure spruce forest, the climax . Where pine is absent from burned-over spruce ls the burn is invaded first by aspen, willow, and , which form the initial stands. These species then gradually replaced by spruce, in much the way as pine is crowded out by spruce in the ession just described. Succession after windfall ry similar to that following fire. On a windfall however, pine does not form such dense pure ls, because widespread bare mineral soil is not nt. Since the humus cover is not destroyed on -down areas, the interval from initial succession to the establishment of the climax type is materially reduced.

Müller's contention that pure, even-aged primeval forests are the manifestations of previous catastrophies—particularly fire— is well substantiated by stand conditions in the pine and spruce types as described. The outstanding characteristic of the Scotch pine type, uniformity as to both age and purity, is in fact due wholly to the occurrence of fire. Going one step further, it may be said that the pines owe their perpetuity in no small degree to the frequent recurrence of fire. Were it possible to exclude fire completely from these pine stands, the entire type in time would be taken over by spruce at its upper altitudinal zone and by beech at the lower limits. Similar instances may be cited of the elimination of a dominant species during succession in primeval forests in the United States; for example, the exclusion of Douglas fir by western red cedar and western hemlock in the Pacific Northwest region (*3*) and of lodgepole pine by Engelmann spruce, Alpine fir, and ponderosa pine in the central Rocky Mountains (*1*).

It is in the pine types, especially Scotch and mugho pines, that the effects of fire are most apparent. Throughout these types evidences of surface, ground, and crown fires occur everywhere. That fire is a comparatively frequent phenomenon in the pine forests is evidenced by the preponderance of young age classes (1 to 40 years). It is by no means uncommon to find such young, pure, even-aged pine stands covering an area of several hundred hectares. Crown fires sweeping through pure pine or mixed pine-spruce stands kill most of the trees except for scattered individuals left standing usually along the upper slopes or on top of the ridges. The fire-killed pines generally fall a year or so after the fire, while the dead spruces remain standing for a much longer time. On the whole, the burned areas are comparatively free from snags. Where pine seed trees exist the bare mineral soil is covered almost directly after the fire by a dense stand of pine seedlings. The Scotch pine of the Bulgarian region is a much more prolific seeder than that of north-central Europe. Likewise its seed are lighter, so that they are carried much farther by the wind. Furthermore, in contrast to the seed-bed conditions found in the managed forests of north-central Europe, where fire is rigidly excluded, in wild, fire-swept Bulgarian forests the exposed mineral soil and layer of ashes favor the germination and early development of the pine seedlings. Natural reproduction is, therefore, assured, a fact that is in direct contrast with the uncertain natural reproduction of this species in Germany. Finally, the growth of the pine seedlings is favored by the fact that repeated surface fires have excluded the establishment of any competing heather vegetation.

Surprisingly, the young natural pine stands arising on burned-over areas have an appearance closely resembling that of managed stands on which such cultural operations as weedings and thinnings have been carried out. The initial dense forests are thinned out by subsequent surface and ground fires. The trees have tall, straight boles with little taper. Because of the "fire weeding and pruning" the trees have a comparatively high percentage of clear length, even when they are immature. Growth, however, is slow, and the sapwood thin. As a rule there is little vegetative cover on the ground; raw humus and moss are conspicuous by their absence. It is not until the pine stands lose their purity through the invasion of spruce that a real humus cover is finally established. With such extensive pure even-aged stands present one would naturally assume that insects and fungi must assume considerable importance, but this is not the case. Müller assumes that the nonexistence of insect or fungal epidemics is due largely to the fact that surface and ground fires keep these enemies in check by burning away the undergrowth and litter cover. Thus, exclusive of its killing action, fire has a three-fold effect on the pine types: it creates optimum seed-bed conditions and furthers the early growth of pine seedlings by removing competing surface vegetation; it weeds and prunes the resultant stands; and, finally, it reduces the danger of insect and fungal epidemics.

As has already been indicated, Norway spruce and European silver fir can not establish themselves on bare, burned-over mineral soil or soil covered with ashes, even if excellent seed trees of these species are in a position to scatter their seed over the area. These two species require a humus soil cover in which considerable moisture is available. As a rule the spruce stands are considerably older than the pine stands. When once a spruce forest has usurped an area formerly occupied by pine, the shade-enduring species of the spruce type, with their long-persisting, low branches so successfully conserve the soil moisture that fires are less likely to occur. This is particularly true before the spruce stands become overmature. Since the invasion by spruce and fir covers a considerable period of time, the mixed spruce stands are less uniform in age than the pine. As the mixed type reverts more and more to a pure spruce or mixed spruce-fir type, the unevenness in age increases. With advance in age there is a corresponding increase in the formation of raw humus acid soil, accompanied by a more or less dense ground cover of moss and other vegetation. Natural reproduction becomes increasingly difficult, so that the very old spruce stands are rather open, with trees of comparatively short height and poor form. When fire does occur in such old stands it is extremely destructive, crowning easily because of the low branches. One interesting evidence of grazing damage to young spruce seedlings is the presence of "nest-grown" spruces. This formation consists of the growth of two or more stems from a common base, giving the appearance of sprout growth rather than of seedling origin.

Pure, even-aged stands of aspen and birch have an even less permanent character than those of Scotch
and mugho pine. Aspen stands more than 40 years
age occur infrequently. The dense, pure, even-ag
stands of this species which arise on freshly bur
over soil usually succumb to a fungus before the tr
reach 20 years of age. Although aspen is v
sensitive to fire injury, where fire does not burn dee
enough into the soil to kill the roots the species spro
prolifically, so that in the second generation there i
much greater percentage of sprout-origin than of se
ling-origin stock. Because of its ability to withsta
shade, spruce is able to form an understory un
aspen, eventually crowding it out. When aspen a
pine seed an area simultaneously, the latter spec
does not successfully establish itself unless the for
is early thinned out by disease or fire. What has be
stated regarding the development of aspen sta
applies equally to birch stands, except that birch is
subject to any particular disease and therefore reac
a more mature age before being crowded out by spr
and fir.

Müller's study of succession in the primeval wo
lands of the Bulgarian mountainous regions is
important and interesting contribution to our kno
edge of this phase of forest development. To me
seems that Müller's conclusions logically induce
question Has fire a legitimate place in North Ameri
silvicultural practice? In Newfoundland, at le
Gilmore (*4*) has found that spruce growth is bet
on old burns than in virgin stands on areas where
fire has occurred for a long time. Such an emin
forest soil specialist as Hesselman (*5*) states that
Sweden, where conditions in general are similar
those in the northeastern United States, "forest fi
have often, if not always, favored reproducti
Stands started on burned soils often show an astoni
ingly vigorous growth, which appears the more n
worthy when compared to the weak growth of sta
on soils long protected from fire but otherwis
geologically and physically—similar." In the south
Appalachian Mountains, magnificent even-aged p
stands of yellow poplar sometimes occur on areas t
differ from adjacent areas supporting less valua
stands only by the fact that they were burned o
prior to restocking (*6*). Lastly, in New England th
is a forestry axiom that "pine does not follow pin
According to Fisher (*7*) many of the pure, seco
growth pine stands in New England exist on land o
used for pasture and tillage, in other words on soil t
prior to the invasion by pine, was bare or had very li
humus cover. May it not be that the judicious use
fire just previous to the harvesting of the pine c
trees (in the early spring when the soil is still fro
but when a surface fire will consume much of the r
humus pine litter) will prove a necessary silvicult
measure to insure the natural regeneration of this p
pine type, and will be followed quickly by the est
lishment of a highly valuable stand instead of
poor-quality mixed brushy stand which so often foll
the clear-cutting of pine?

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A New Method of Applying Yield Tables

By C. Edward Behre, United States Forest Service

As a result of unsatisfactory experience in applying normal yield tables in the usual way, i. e., by assuming that future yields will approximate those given in the yield table in the same ratio in which present basal area approximates the corresponding yield-table figure, G. H. Barnes suggests [7] basing all yield prediction for even-aged stands on the average diameter of the stand. He shows that this simple procedure gives results much closer to actual experience in dealing with the lodgepole pine stands of the Yahk Forest in British Columbia.

The weakness of the conventional method of predicting yields on the basis of site and age by applying the basal area ratios is especially serious when merchantable volumes are sought rather than total yield in cubic feet.

The method presented by Barnes consists of the following steps:

1. Estimate future average diameter from an anamorphic chart based on a curve of average stand diameter over age which can be conveniently presented as an alinement chart.

2. Use this estimated average diameter to obtain the future number of trees per acre from a curve of number of trees per acre over average diameter.

3. Use the estimated average diameter again to obtain the future average height of the stand from a curve of average height over average diameter of stand. In this step it is assumed that the stand will maintain in the future the present ratio between actual height and the curved height corresponding to its average diameter.

4. Apply these figures to charts showing the volume per 100 trees according to average height and average diameter of the stand. These volume charts may be prepared on any basis desired such as total cubic content or merchantable volume in board feet.

In order to prepare the volume charts used in this method it is necessary (1) to employ stand tables based on average diameter to distribute the estimated number of trees among the diameter classes, and (2) to have a basis for assigning an average height to each diameter class. With this information volume tables can be applied to the data at hand. For convenience of application the total volumes are reduced to the basis of volume per 100 trees according to average height and diameter of the stand. The assignment of an average height to each diameter class in the stand table is accomplished by sorting the basic plot data according to average diameter and expressing the average height of each diameter class as a percentage of the height of the average diameter class. These values are then harmonized graphically.

By developing this modification of yield prediction methods Barnes has made an important contribution to a much-debated question. Average diameter and number of trees per acre constitute one mode of expressing the distribution of the trees among the size classes, which is obviously the primary factor in determining the yield according to any standard of utilization. It is probable that future advances in forest mensuration will develop from further studies of the characteristics of the stand tables.

Seeding Tests With New Mexico Forage Plants

By R. R. Hill, United States Forest Service

Under the title "The Artificial Reseeding of New Mexico Ranges," [8] C. P. Wilson has reported on experiments carried out by the New Mexico Agricultural Experiment Station in various parts of the State with seed of many forage plants. His account is clear and complete, and is well illustrated. The results of the experiments are conclusive in regard to the germination of seed of the different plants tested, and indicate in a general way the extent to which a number of the species may be expected to become established in small plots from which competing growth has been largely eliminated. They are not at all conclusive, however, as to the extent to which most of the species considered may be expected to become established under actual range conditions.

In general, the problem of range revegetation is concerned chiefly with increasing a stand of vegetation already established and encouraging the ascendency of the more desirable plants of the association. Most of the species included in these tests are native to New Mexico and are already established to a greater or less degree over large areas of range land in the State. Presumably they already have the opportunity to develop seed and their seed has opportunity to germinate. This process has been going on, through favorable and unfavorable seasons, over an indefinite period of time. The question arises as to whether artificial reseeding with native species will be any more successful over a period of years than the natural reseeding of the same species. If artificial reseeding is to be any more successful than natural reseeding has been it would seem necessary to establish more favorable conditions, as by preparing a seed bed, removing competing plants, restricting grazing, and eliminating rodents. Mr. Wilson does not indicate what measures of this kind would be necessary to the success of artificial revegetation. Neither does he consider whether if natural reproduction were assisted by such measures satisfactory revegetation would result.

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[7] Barnes, G. H.: The importance of Average Stand Diameter as a Factor in Forecasting Timber Yields. 24 pp., including 6 tables and 9 charts. British Columbia Department of Lands, Forest Service. 1931.

[8] Bulletin No. 189, New Mexico Agricultural Experiment Station.

There is little question that under certain conditions, such as on abandoned farms with tillable soil and on denuded flats where the soil is deep and moist, artificial reseeding would be more successful and more economical than any other method of increasing the forage stand; but for the greater part of the New Mexico ranges, where the original composition of the vegetative cover has not been radically modified and where conditions for rapid revegetation are unfavorable, both the practicability and the need of artificial reseeding are questionable. Only when these phases of the question have been thoroughly covered in a reseeding experiment can information be made available to the landowner that will safely guide him in determining whether he should resort to artificial reseeding and if so when and where he should practice it.

The germination-test data tabulated are valuable for reference and as a guide in selecting plants for artificial reseeding. Additional information regarding the soil, rainfall, and other conditions that are favorable to the establishment of individual forage species would add greatly to the usability of these data.

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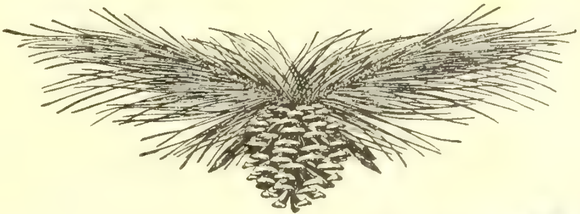

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Announcements

Allegany School of Natural History Announces Courses

The sixth annual session of the Allegany School of Natural History, conducted by the Buffalo Society of Natural Sciences in cooperation with the New York State Museum, will be held July 5–August 24, 1932, in Allegany State Park, N. Y. Courses will be offered in field zoology, field geology, field botany, natural history of birds, and nature study. Enrollment is limited to 50. Correspondence regarding registration should be addressed to Harold T. Clement, Curator of Education, Buffalo Museum of Science, or to Robert E. Coker, Director, Allegany School of Natural History, Box 950, Chapel Hill, N. C.

American Association for the Advanc ment of Science

The American Association for the Advancement Science and a number of its associated societies w meet at Syracuse, N. Y., June 20–25, 1932. Interesti programs are scheduled in botany, zoology, math matics, physics, chemistry, geology, psychology, ec nomics, medicine, engineering, and agriculture. De Hugh P. Baker of the New York State College of F estry is arranging the program for a symposium on la use. Field trips are planned to the Geneva Expe ment Station, the New York State College of Agric ture at Cornell University, and many interesting pla around Syracuse.

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State Forestry

Maine Tests Indicate Control Method for White Grubs

By H. B. Peirson, State Entomologist, Maine

During the past year 11 nurseries cooperated with he Maine Forest Service in working out a satisfactory ontrol for white grubs. A total of 107 plots were reated with crude arsenic in quantities varying from 00 to 1,500 pounds per acre. Seedlings and trans-lants of 11 coniferous species were used in the experiments. The plots included three types of soil—fine andy loam, sandy loam, and sandy silt loam.

The results strongly indicate that 200 pounds of rude arsenic per acre should be used the first year of pplication. In following years 150 or 100 pounds er acre will usually prove satisfactory. In plots reated for the first time with 200 pounds of crude rsenic per acre, the grubs killed an average of only bout 2 per cent of the trees, whereas on untreated heck plots they killed as many as 63 per cent. No pecies of tree experimented with was immune to damage. The heavy soils appeared to be most favorable o grub damage, and the nurseries most subject to rub injury were those using manure as a fertilizer. t is believed that manure attracts the beetles.

Crude arsenic costs about 7 cents a pound. The equired quantity is mixed with either dry soil or commercial fertilizer and broadcast evenly over the plot, hen harrowed or spaded into the soil.

A series of potted Norway pine trees were carried hrough the past winter to determine how much rsenic trees can stand in the soil. Quantities of from 85 to 37,484 pounds per acre were tried. Nearly all rees in soil treated with 4,500 pounds or more per acre lied, and one series treated at a rate of 2,343 pounds er acre were killed. An analysis of needles from trees hat had died showed relatively large quantities of rsenic present.

The appearance of trees injured by arsenic is very listinctive in the early stages, in that the needles are rown at the base while still green at the tip.

One plot of Scotch pine seedlings which had been reated with crude arsenic at the rate of 1,500 pounds er acre showed possible signs of burning. This was he only arsenic injury found in the field. There ap-ears to be some danger of the accumulation of excessive quantities of arsenic in soil that is treated with heavy doses year after year. Quantities which we have found satisfactory should cause no injury. The arsenic is quite soluble and leaches out. In several nurseries what was termed "arsenic injury" was in reality due to other causes.

The results from the past season's work are inconclusive owing to the great variation in the numbers of grubs present in different plots. This year we are not asking any nursery to continue this work. Instead we plan to run a series of control plots in which known numbers of grubs are present, using known quantities of arsenic.

New York Conducts Planting Experiments on Areas Specially Reserved

Continuing its work of establishing experimental forest plantations, in the spring of 1931 the New York State Conservation Department set aside exclusively for experimental planting an area of about 70 acres in the town of Charleston, Montgomery County. This area, including about 45 or 50 acres of old fields, was chosen as typical of much of the land now being acquired by the department for reforestation in southern and central New York. It lies at 1,300 feet elevation near the crest of the formation known as "Oak Ridge," which divides the Schoharie Valley from the Mohawk, and is readily accessible from U. S. Route 20 at Sloansville or from the Mohawk Valley route at Fonda. The soil is principally of the Volusia series, a type on which occurs much of the abandoned agricultural land of this section.

One purpose in setting aside this area is to develop a forest arboretum in which can be grown experimentally a number of species other than those now being used generally in reforestation in New York and special strains of species such as Scotch pine. The half-acre has been selected as the smallest unit on which the conditions of a forest stand can be obtained. In 1931 arboretum plantings were made with *Pinus ponderosa* and its Rocky Mountain form, designated by some botanists *Pinus scopulorum;* with *Pinus sylvestris* (Scotch pine) of the Riga and Czechoslovakian varieties and of strains naturally reproduced at Boonville, N. Y., and Halsey, Nebr.; and with Asiatic chestnut.

Parts of this area will be used for "indicator" plantings such as have been developed in previous years at Forestport, Oneida County, and on the Connecticut Hill State Game Refuge in Tompkins County. The object of these experiments is to test, side by side, seedling and transplant stock of the species commonly used in reforestation work in New York. The trees are planted 6 feet apart each way by the conventional method of making a slit with the grub hoe. In preparation for the planting the turf is stripped from half of each plot. On the Oneida County area some plowing has been done preliminary to planting.

The third type of experimentation for which the Montgomery County area is destined has to do with the behavior under field conditions of trees produced in the course of various nursery experiments. Trees will be planted here that are the product of tests with commercial fertilizers, different methods of sowing, and the use of paper mulch. Last year 94 lots of trees from experimental plots at the Saratoga nursery were set out on the area, including 3 and 4 year transplants of northern white pine, Norway pine, Scotch pine, Norway spruce, white spruce, and northern white cedar from plots that had been treated with mineral and organic fertilizers. In the treatment of these trees 10 different fertilizers had been used singly or in combination.

A piece of forest-preserve land about 63 acres in extent in Essex County has been reserved for experimental use. This area, lying at 1,700 feet elevation and typical of much of the abandoned farm land in the Adirondacks, is well adapted for testing species and strains of five-needled pines for hardiness and resistance to the white pine blister rust. Here 1,000 trees each of northern white pine (*Pinus strobus*), western white pine (*Pinus monticola*), and limber pine (*Pinus flexilis*) were planted in 1931.

In the fall of 1931 a 60-acre plot of State land in Saratoga County was made available for experimental planting in connection with pathological investigations at the Saratoga nursery. Here trees that develop pathological conditions in the nursery will be set out at a safe distance from plantations of healthy trees in order that the progress of disease or of the trees' recovery may be observed.

Planting experiments which the conservation department has under way on other lands include the propagation of Japanese black pine (*Pinus thunbergii*), which is believed to be especially well adapted for growing under the maritime conditions that prevail on a great part of the area of Long Island. The actual planting of this species is being supervised by the Long Island Park Commission.

◆

By order of the Oregon Tax Commission, classification as reforestation land was recently extended to 348,354 acres of land in Clatsop, Columbia, Coos, Tillamook, Marion, Linn, Lane, and Deschutes Counties.

Relief Agencies Chosen as Medium Recruiting New York's Spring Planti Forces

Plans adopted by Conservation Commissio Henry Morgenthau, jr., for reforestation work in spring of 1932 on lands recently acquired by the St of New York provided that all the labor used should employed through unemployment relief organizatic This involved employing about 3,000 men thro relief organizations in the 15 counties where St lands were to be reforested. All men engaged were be given six full days' work each week, when weat conditions permitted, for from three to eight wee The expense of the work, approximately $150,000, to be met from the department's regular approp tions, not from a special relief appropriation.

Of the $20,000,000 which the New York Legislat made available to the State's temporary emerge relief administration, the conservation departm received $400,000. Much of this has been used State parks, where men so employed have carried not only cleaning and clearing operations but m improvement work of a permanent character such building trails, planting trees and bushes, and level recreational areas. Allotment of $70,000 of this f to gipsy-moth control made possible the employm of extra men for this purpose during the peri between leaf fall and the accumulation of snow on trees, when gipsy-moth clusters are most eas detected. Officials of the conservation departm have expressed satisfaction with the quality of work done by men employed with relief funds.

Minnesota Patrolmen's School

One patrolman at large from each forestry dist of Minnesota attended a patrolmen's school held the State forest service at Grand Rapids March 3– 1932. Morning sessions, held in city hall in rooms the city council, were devoted to instruction in vari phases of State forestry work and discussion of dist problems and forest-service policy. A representat of the State attorney general's office gave instruct in legal matters. Each student had his turn as speaker and six students engaged in a debate. Aft noons were given over to practice of field methods

◆

Hawaii's forest reserve system was enlarged by 42, acres in the year ending June 30, 1931, reaching a to of 1,021,314 acres. The Territory owns 65 per cent the lands included in the reserves on the five larg islands, and completely controls 13 areas, totaling 2 439 acres, of privately owned land within the reserv One-fourth of the total land area of the Territory now under forest protection.

Forest-Protection Surplus Enables Maine to Reduce Tax

When Maine had spent $196,929 on the protection of s forestry district in 1931, there remained on hand 151,992 of protection funds for the district. Accord- gly landowners have been allowed a 30 per cent ebate on their 1932 assessments.

Fire-protection expenses for 1931 in the forestry istrict, which is **a** 10,000,000-acre area constituting oughly the northern half of Maine, included $105,072 r personnel, $27,662 for improvements, and $46,157 r tools and supplies. The 86 fires that occurred uring the year were held to an average of 6.5 acres ach, and less than 0.006 of 1 per cent of the district's otal area was burned over. In the 5-year period 925–1929 fires had covered yearly an average of 038 of 1 per cent of the district's area.

In the 11 organized towns in southern Maine where a ooperative forest-protection system was put into fect in 1931, involving a total area of 5,000,000 acres, e system has given general satisfaction. Fires ported during the year numbered 134 and covered a otal area of 4,275 acres. In each of the towns a ounty warden was employed at State and Federal xpense. Each warden was equipped with a small atrol car and with sufficient fire-fighting tools for 18 en. The State and the towns cooperated in buying 32 portable 5-gallon back pumps and 281 fire-fighting ools. Six steel lookout stations were erected.

◆

The 992 forest fires recorded in 1931 by the Connec- cut Department of Forestry burned an average of 3½ acres each, as compared with an average of 35½ cres for the past 11 years. Fires that were confined areas of less than 10 acres each composed 62 per ent of the year's total.

◆

For the Lower Peninsula of Michigan the lapse of me between the sighting of a forest fire from a State ookout tower and the arrival of a State fire-fighting rew at the scene of the fire averaged 39.7 minutes in 931. For the State as a whole the "elapsed time" veraged 53 minutes. Fires recorded during the year y the State division of forestry totaled 4,133.

Rhode Island Club Plans State Forest Purchase

The Edgewood Women's Club, of Rhode Island, is eading a movement for the purchase of Rhode Island's rst State forest. The club has taken an option on a woodland area of 125 or 150 acres in the township of Glocester adjacent to the Putnam Pike, an improved State highway. This land, which is stocked chiefly with young hardwoods, is so located that hundreds of acres of similar adjoining land could be added later at small cost. It is planned to dedicate the projected State forest as a memorial to George Washington and to use it for forestry demonstration. At the invitation of the Edgewood club various patriotic and civic groups and several individuals have each contributed $25 toward the purchase.

Acceptance by the State of gifts of land or money to be used for forest demonstration or experimentation purposes is authorized by a Rhode Island law enacted in 1931.

◆

Maritime pines planted two years ago on grounds of the naval radio station on the north side of Coos Bay, Oreg., as an experiment in sand fixation showed a survival of about 75 per cent when inspected recently by S. L. Miller, of the State forester's office, and J. A. Walsh, district warden of Coos County. Native beach grass was planted on the area in rows about 2 feet apart a year before the pines were planted. The trees were set out 6 feet apart each way. The planting covers about 100 acres.

◆

The number of trees planted on Hawaii's forest preserves in a single month reached its peak in October, 1931, when 49,764 trees of 46 species were planted. During the same month 36,955 trees were distributed from the Territorial forest nurseries to farmers. The George Washington bicentennial grove at Mokapu Game Farm was enlarged by the planting of the second 1,000 coconut trees.

◆

Pine trees were planted on 20,000 acres of Michigan's State forests in the fall of 1931. The total acreage reforested by the State during the year was 31,667. Michigan State forest areas on which trees have been planted now total 129,600 acres, or about one-fifth of the acreage of the 12 State forest units.

◆

State-grown forest trees that were planted in Pennsylvania in 1931 numbered 8,624,985. Of this total 605,300 were set out on State forests, 262,000 were planted by 13 mining companies, and 250,000 were used by 32 municipalities on watershed, forest, and park areas. The State's income from the sale of forest trees in 1931 was $15,301.09.

◆

In beginning a new series of broadcasts over radio station KOAC this spring the Oregon State forestry organization chose to discuss principal forest trees of the State, telling something about the discovery and naming of the species and giving some identifying characteristics of each.

Oregon Fires of 1931

The 1,621 fires that occurred in 1931 on Oregon lands patrolled by the State and by forest-protection associations burned over 188,494 acres of forest land. The total area burned included 32,007 acres stocked with mature timber, of which 156,125,000 board feet is estimated to have been destroyed. In addition it included 71,735 acres stocked with young timber. Incendiarism was identified as the cause of 548 of the fires and smokers were charged with starting 415 of the remainder. Lightning fires were fewer than in any other season since 1916, numbering only 85.

Funds expended during the year in fighting fires on State and private land in Oregon totaled $211,124. The total amount expended during the year for protecting these lands from fire, including expendit on improvements, was $611,353.

* * *

A natural arboretum discovered in 1931 in a gulch of Makua Valley, Oahu, Hawaii, contained w in a radius of 200 yards no less than 42 different ki of native Hawaiian trees. The native kolomona found here to attain a height of 38 feet.

* * *

The city of Newnan, Ga., recently planted 27, tree seedlings on 48 acres of its town forest at average cost of $3.62 per acre. The trees inclu 22,000 longleaf pines, 2,200 black locusts, and 2, black walnuts.

Education and Extension

Forestry at the University of Arkansas

Two forestry courses are now offered by the University of Arkansas, under the direction of J. R. Cooper, professor of horticulture and forestry: one in farm forestry, stressing the place of forestry in farm economy, which is required of all agricultural sophomores; and one in elementary silviculture, both theoretical and applied, which is an elective open to all agricultural students with sophomore or higher standing.

As summer work the university's department of horticulture and forestry and its department of agricultural economics are making a study of farm forestry on marginal lands in Arkansas, with the cooperation of the Southern Forest Experiment Station. Throughout the year physiological and morphological research is being conducted under the supervision of Lewis M. Turner, assistant professor of forestry.

Maine Students Occupy New Forest Camp

Senior forestry students of the University of Maine encamped during the past winter on Indian Township, near Princeton, Me., where they had the use of new buildings erected in 1931 for permanent use by the university. Authority to permit the university to erect and maintain a forestry camp on Indian Township, which is State property, was granted by an act of 1930, which provided that logs for building the camp might be taken from the township without charge. Curtis M. Hutchins, of the Passamaquoddy Land Co., enabled the university to take advantage of this offer by giving $1,000 for construction expenses. A site was chosen just north of the junction of the Grand Lake Stream road with the Houlton road. The completed camp consists of four buildings of solid log constructi on concrete piers. The cook-camp, which includes assembly room, is 30 by 60 feet, and there are f bunkhouses 18 by 24 feet.

While in camp during the past winter the stude traversed roads, ran lines, and made plot estimates the standing timber. A detailed topographic map w prepared for the areas covered, together with a ty map of the present stand. Sample plots for the stu of growth and yield were laid out, and a careful ta was made of the present timber stand.

Ultimately it is expected to put Indian Towns under permanent forest management on a sustain yield basis.

* * *

Beginning with the fall of 1932 the forestry depa ment of the Michigan State College plans to offer opp tunity for specialization in municipal forestry. A ser of courses designed to meet the special needs of m engaging in municipal, county, and public-util forestry will be available to juniors and seniors.

* * *

Of the 657 living graduates of the New York Sta College of Forestry whose occupations are known to t college, 67 per cent are engaging in work of the type which they received training at the college. The to number of men to whom the college has granted degr since it was founded in 1912 is 698 and the livi graduates number 685.

* * *

Twenty-nine North Carolina firms that will b veneer logs direct from farmers are named in a l circulated by Extension Forester R. W. Graeber. T list indicates in most cases what kinds of logs the fi will purchase.

Forest Service Notes

Marks of Fire on Bark of Southern Hardwoods Afford Measure for Internal Wounds

By measuring in the field the external discoloration left by fire on the trunks of southern mountain hardwoods, silviculturists are now able to estimate fairly accurately the size of the wounds which the fire has left in the inner bark. The correlation of size of exterior discoloration with size of interior wound and the simplified field method for measuring discoloration that permit this are the work of R. M. Nelson and I. H. Sims, of the Appalachian Forest Experiment Station. The data on which their findings are based were obtained by examining 350 trees, from 4 to 28 inches in diameter at breast height, on an area at McFalls Creek, Va., that was burned in the spring of 1930. These trees showed no crown damage and no other abnormalities aside from bark discoloration.

Of the five important tree species present on the area examined, for a given diameter and a given area of discoloration, yellow poplar showed the smallest wound and scarlet oak the largest. White oak, chestnut oak, and black oak ranked in different orders somewhat according to the particular diameters and areas of discoloration chosen as the basis of comparison.

On the average, in the case of trees 10 inches in breast-height diameter, when fire causes 5 square feet of discoloration on the outer bark it leaves an inner wound of 1½ square feet on yellow poplar, 3 square feet on chestnut oak, 4 square feet on white oak, 4½ square feet on black oak, or 7½ square feet on scarlet oak. The correlation in size between the scorched area and the internal wound was fairly high except in the case of scarlet oak. This species is so susceptible to injury that in some cases the inner bark had been killed to a height of 20 feet above the highest point of discoloration on the exterior bark.

An attempt to classify the trees according to the intensity of heat to which they had been subjected by dividing the discolored areas into three classes—scorch, char, and burn—led to a slight gain only in correlating external discoloration with internal wound.

Experimental methods have been devised for comparing the insulating properties of different barks at different seasons. An increase of as little as one-tenth inch in bark thickness has been found to alter very decidedly the length of time required to kill the cambium.

Preliminary observations made on the McFalls Creek burn within a year after the fire indicated no correlation between severity of basal wound and abundance of basal sprouts.

Further studies have been undertaken to determine the effect of basal wounds on growth and on the entrance of heart-rotting fungi. Like other burned-over hardwood areas in the region, the McFalls Creek burn showed an abundance of fungus fruiting bodies the second summer after the fire. The investigators estimate that about 90 per cent of the butt rots in hardwoods of the Southern Appalachians enter through fire wounds.

◆

The Colorado National Forest, in northern Colorado, has been renamed the Roosevelt National Forest, in commemoration of President Theodore Roosevelt. This forest, having a gross area of 1,101,958 acres, lies on the eastern slope of the Continental Divide and extends from Clear Creek to the Wyoming State line.

Operation to Control Douglas Fir Beetle on the Shoshone

By J. A. Donery, United States Forest Service

During the summer of 1931 forest officers on the Shoshone National Forest, in northwestern Wyoming, found that the Douglas fir beetle (*Dendroctonus pseudotsugae* Hopk.) had attacked Douglas fir on areas where the timber had been damaged by the spruce budworm (*Cacoecia fumiferana* Clem.). Members of the Bureau of Entomology, after examining the timber on several drainages to ascertain the extent to which beetles were present, recommended that the infested trees be felled and cut into logs to be skidded, decked, and burned. Because of the fact that the insect passes the winter in adult form and because of the thickness of the bark, it is necessary that the bark from the infested portion of the tree be completely destroyed.

Beetle infestation was found on 12 areas ranging from 128 acres to 1,280 acres and totaling 5,786 acres, located along the North Fork of the Shoshone River and its tributaries, from Eagle Creek eastward for a distance of approximately 15 miles. These areas consist largely of very rough, steep, rocky slopes. Narrow strips of level land border the streams, and occasionally areas of gently sloping bench land are found at the bottom of the steep slopes.

The timber on the areas covered by control work consisted almost entirely of Douglas fir, with only an occasional Engelmann spruce or limber pine tree. Two of the larger areas had been rather heavily cut over during the period 1927 to 1930 in an effort to salvage the merchantable timber that had been killed or seriously damaged by the spruce budworm. On the greater part of the total area worked over the trees were thrifty in appearance; if they had not been weakened by the attacks of the spruce budworm it is possible that they would have withstood the beetles. The trees attacked by the beetles were of fair size, those treated ranging from 5 inches to 42 inches in diameter with an average diameter of 14 inches. In fact, a large proportion of the infested timber was suitable for the production of sawed railroad ties and lumber.

A marking crew composed of an entomologist and two rangers inspected each tree on the timbered portion of the drainages for evidence of beetle infestation and marked the infested trees for cutting, using 4 by 6 inch muslin tags. Each tag bore a number. This number was later entered in a scale book with the diameter of the tree. After the tree had been cut, the number of logs obtained was entered. The log scale and tree volume were later computed from volume tables and a complete record made.

The cutting and burning operation was directed by a logging engineer assisted by a ranger experienced in logging methods. His crew consisted at first of 15 men and 2 teams but was later increased to 38 men and 3 teams. The operation was begun October 5 and was completed December 31.

Sawing crews of two men each felled the trees and cut the infested portions into logs. The sawyers were followed by swampers, usually one swamper to two crews, who limbed out the logs and cut skid trails. As a rule the swampers peeled the bark from the stumps and placed it on the log decks to be burned. At times the bark was placed on the ground with the inner side upward in order that the adult beetles and larvae might be eaten by birds or rodents or otherwise killed by exposure. Along roads and trails the brush from the tops of trees was piled and burned. Elsewhere the tops were left untrimmed where they fell.

Skidding and decking crews followed the swampers, each crew consisting of a teamster and team, a chain tender, and a deck man equipped with a cant hook. When the logs had been skidded to a convenient point they were rolled into decks by means of skids. The decks varied in size according to the number of logs available at each location; skidding distances were held to a minimum consistent with the need of obtaining a sufficient number of logs in each deck to insure complete burning. Burning of the decked logs was begun as soon as there was sufficient snow on the ground to prevent the spread of fire, and from that time on the decks were burned as they were completed. On portions of the areas where the slopes were too steep to permit the use of teams, crews of from three to six men skidded and decked the logs by hand. On slopes so steep that decking of any kind was impractical the logs were hand-skidded to a point where they could be reached by the teams and were then skidded, decked, and burned in the usual manner.

A total of 2,427 man-days and 134 team-days were spent on the work, the average number of trees treated per man-day being 5. The work-week consisted 44 hours (Saturday was a 4-hour day). The m received $3 (teamsters $3.50) for an 8-hour day a board. The cost of board amounted to $1 per m per day. A total of 12,038 trees were disposed of, t tree volume being 2,132,000 board feet. Appro mately 21,000 logs were cut from the 12,038 tre with a volume of 1,687,000 board feet, log sca The cost of the work amounted to $11,938, averagi $7.08 per 1,000 board feet, log scale, or $0.98 for ea tree treated.

A sawmill camp located near the center of the ar to be worked over was available for use, so that was not necessary to construct camps or to use tent The camp was located on the highway that travers the area, and this made it possible to transport the me to and from work in trucks. More than two-thir of the trees cut were within 3 miles of camp, and th presence of roads in several of the drainages helpe greatly in getting men to the job without loss of tim

The season was very favorable for conducting wor of this character, as little snow fell during the tim operations were in progress. The snow was neve deep enough to interfere with the logging operation in fact, skidding was accomplished more easily whe there was snow than where the ground was bare.

Local men were employed on this project. Whil very few of them could be classed as having experienc in woods work, most of them were willing workers an their output increased as they gained experience.

Photographic Recording of Forage Production Now Practical

Photographic methods of recording forage production and vegetational changes on sample plots hav been brought to a practical stage through severa seasons' experimental work on the national forests o Colorado. C. A. Kutzleb, who has had direct charg of this work, has developed a technique by whic meter-square plots can be photographed at moderat cost in time and money. The camera is suspende from a tripod and the exposure is made at a poin directly above the center of the plot, at a uniforn height from the ground. To photograph an averag plot requires only about 30 minutes. As improved b Mr. Kutzleb the equipment is so compact that it ca easily be carried by one man. To express the quantit of growth produced by different plots as shown by th photographs, the tufts or clumps of plants are outlined and their perimeters are measured according t scale.

This method of recording forage production wil undoubtedly prove useful in combination with chartin and listing in the field. As compared with a ma developed by charting, the photograph has the grea advantage of constituting a complete record of conditions. A chart, even though perfectly satisfactory fo its immediate purpose, can not be expected to include the detail that may be called for by the subsequent velopment of research interest in growth features her than those for the study of which the chart was ade.

Difficulties are encountered in using this method ere forage plants growing in mixture can not readily segregated. Photography promises to supplement her methods of recording changes in vegetation her than to replace them.

Northeastern Station Moves to New Haven

Headquarters of the Northeastern Forest Experi-nt Station will be transferred about June 1 from herst, Mass., to New Haven, Conn. Quarters at herst, which the station has occupied under a co-erative agreement with the Massachusetts Agricul-al College ever since its establishment in 1923, are longer available. Under new arrangements the tion will have the use of offices and laboratories in Farnum House, Yale University. Headquarters the United States Forest Service district inspector the Northeastern States will likewise be changed m Amherst to New Haven.

* * *

Memberships in the International Union of Forest search Organizations have been taken out by the rest Service for its Washington office, for the 11 est experiment stations, and for the Forest Products boratory, official contribution to the union's work ving been made possible through a proviso in the icultural appropriation act for the fiscal year 1932.

Mortality in Old Field Loblolly Pine

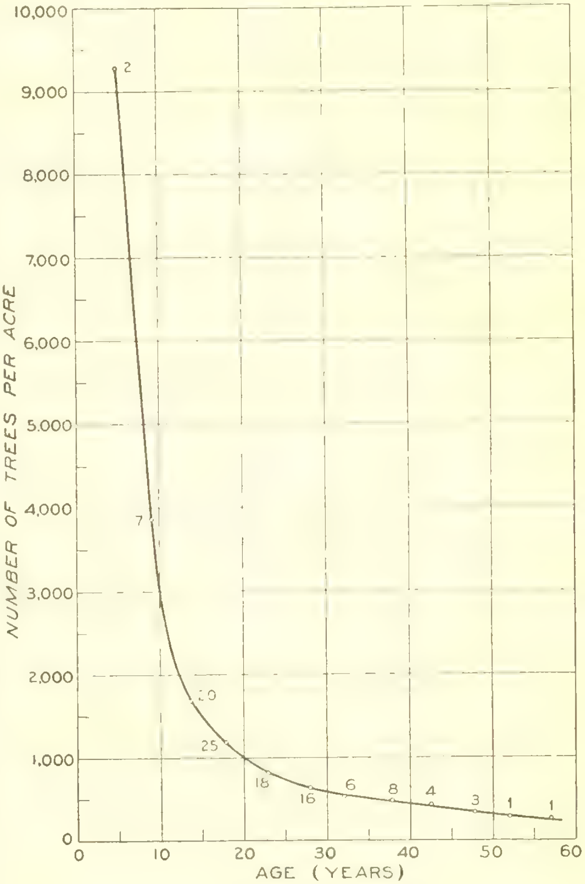
By G. Luther Schnur, United States Forest Service

On the Eastern Shore of Maryland loblolly pine ds in naturally on abandoned fields, good seed-bed nditions and abundant supplies of seed from adjacent nds of timber facilitating full stocking of these areas. n thousand trees to the acre is not uncommon at the eption of the stand. Growth is very rapid and the ht for light, food, and water begins early. During first 10 years mortality is very high; literally ndreds of the trees are crowded out on each acre.

From 34 permanent sample plots established in 1906 private property in Worcester County, Md., and neasured at 5-year intervals, the Allegheny Forest periment Station has 111 individual plot measure-nts. The density of stocking on these plots ranges m 70 to 100 per cent. The average site index of the minant and codominant stand at 50 years is 75 feet, total site index range being but 10 feet. Measure-nts at 5-year intervals were continued until natural conditions were disturbed by the owners. The numbers of plots measured are as follows:

1906	34	1925	9
1910	23	1930	5
1915	23		
1920	17	Total	111

The stands on the individual plots were sorted into 5-year age classes. The average number of trees per acre in each class was plotted and expressed by a smooth curve, shown in the accompanying figure. The average number of trees per acre was found to have dropped from 9,270 to 3,000 during the period between the ages of 5 and 10 years, a loss of 68 per cent. This initial period of rapid adjustment was followed by a 15-year period during which the rate of mortality gradually decreased. In this intermediate period the number of trees fell from 3,000 to 700 per acre, a loss of about 24 per cent. The total loss between the ages of 5 and 25 years was 92 per cent. Between 25 and 50 years a steady decrease occurred, amounting to 400 trees, or 5 per cent. The total loss at 50 years is, therefore, 97 per cent.



An Aid for Measuring Mine Props

By R. A. CHAPMAN, United States Forest Service

The great quantities of wood used by the mining industry of Pennsylvania are drawn mostly from local sources. Because these products are sold in small quantities and by a variety of measures it is difficult for the seller or the buyer to appraise them, unless he is skilled in timber estimating. To aid the unskilled buyers and sellers the Pennsylvania State College and the Allegheny Forest Experiment Station have cooperated in publishing a 24-page bulletin entitled "The Measurement of Mine Props: Linear Foot, Top Diameter, Weight, and Volume Tables." The authors are Arthur C. McIntyre G. Luther Schnur.

Charts from which most of the tables were deri are included in the bulletin. They are of a type t to most laymen would, at first sight, seem very c plicated. The authors have devoted some space explaining the use of these charts; since the bulleti meant for an audience largely unfamiliar with cha it seems that more space might well have been gi to this explanation.

The authors estimate that the mining industry Pennsylvania uses annually about 75,000,000 cubic of forest products.

Copies of this bulletin can be obtained from Pennsylvania State College, at State College, Pa.

General Forest News

Fire Resistance of Trees of Northeast United States

By T. J. STARKER, Pennsylvania State College

In each region of the United States some one tree species is reputed among foresters to be the most fire resistant. The Pacific Northwest has its Douglas fir, the South its longleaf pine, the Northeast its pitch pine, the northern Rockies the thick-barked western larch, and California perhaps possesses the grand sweepstakes champions in the Sequoias. After the outstanding tree is named, there is no such unanimity of opinion as to the order in which other species follow. With this in mind an endeavor has been made to list 22 species in the order of their resistance to fire for the Eastern States north of the Mason and Dixon line. The data collected are almost entirely of an empirical character.

A questionnaire was mailed to 48 of the leading foresters familiar with this region and was answered by 41[1] of them. The questionnaire asked for an opinion as to the relative fire resistance of 40 to 80 year old trees of the various species, the opinion to be based on a consideration of bark thickness, root habit, branch habit, canopy cover, and degree of inflammability of foliage. Some of the replies were complete in every detail, listing the 22 trees in order according to the opinion of the writer, while others were merely comments on a few trees with which the author especially familiar.

Compilation of the 41 answers resulted in the foll ing ranking of the species: 1, pitch pine (*Pinus rigi* 2, chestnut oak (*Quercus montana*); 3, Norway (*Pinus resinosa*); 4, black oak (*Quercus velutina*) white oak (*Quercus alba*); 6, scarlet oak (*Quercus cinea*); 7, northern white pine (*Pinus strobus*); 8, e ern hemlock (*Tsuga canadensis*); 9, sugar maple (*saccharum*); 10, red maple (*Acer rubrum*); 11, tamar (*Larix laricina*); 12, yellow birch (*Betula lutea*); red spruce (*Picea rubra*); 14, black cherry (*Pru serotina*); 15, Norway spruce (*Picea excelsa*); 16, g birch (*Betula populifolia*); 17, paper birch (*Be papyrifera*); 18, aspen (*Populus tremuloides*); white spruce (*Picea glauca*); 20, eastern red ce (*Juniperus virginiana*); 21, northern white ce (*Thuja occidentalis*); 22, balsam fir (*Abies balsam*

This compilation of opinions based on observat applies to a very extensive area, with varied site c ditions and a great range of mixtures. No claim be made, of course, as to its reliability. It is ho that concrete data will be forthcoming such as serve to amplify and correct it. Such data would useful from the standpoint of forest planting, of fo management, and of forest fire insurance.

Data collected by O. M. Wood, of the Allegh Forest Experiment Station, on number of trees inches or larger in diameter killed on 11 south Jer fire-damage plots of 1930 are as follows:

	Total trees	Trees killed	
		Number	Per c
Shortleaf pine	44	8	
Pitch pine	107	29	
Chestnut oak	13	7	
White oak	92	52	
Scarlet oak	68	43	
Black oak	7	7	1

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[1] The helpful cooperation of the following is acknowledged: R. D. Forbes, O. M. Wood, S. T. Dana, Leslie S. Bean, Ellwood Wilson, Edward C. M. Richards, W. G. Howard, E. B. Moore, Eugene C. Winch, G. K. Fenger, G. S. McIntire, C. E. Behre, C. R. Tillotson, M. Westveld, R. W. Stadden, E. O. Ehrhart, L. L. Bishop, W. R. Adams, John M. Briscoe, E. N. Munns, John H. Foster, L. J. Young, J. M. Sloan, Geo. S. Perry, S. N. Spring, S. S. Lockyer, H. J. Baldwin, C. L. Woodman, A. F. Hawes, T. Roy Morton, R. C. Hawley, A. B. Recknagel, P. T. Coolidge, E. F. McCarthy, H. O. Cook, Willis M. Baker, T. S. Woolsey, Geo. H. Wirt, John F. Preston, J. W. Toumey, T. C. Harbeson, and Ralph M. Nelson.

In a study of bark thickness on 1,163 oak trees from 2 to 20 inches in diameter A. C. McIntyre, of the Pennsylvania State College, found that chestnut oak led in thickness of bark, followed by black oak, red oak, scarlet oak, and white oak in that order. It will be seen that the questionnaire material agrees rather closely with these two sets of data.

Weevil Does Little Harm to Riga Pine

Examining 19 plots in New York and Massachusetts plantations of the so-called "Riga" strain of Scotch pine, H. J. MacAloney and J. W. Johnston, of the United States Bureau of Entomology, found that the number of leaders dead as a result of white pine weevil attack was very much less than the number in which weevil eggs had been laid. Of the 3,386 trees examined, ,110 had been attacked, but only 39, or 1.15 per cent of the total number, had died as a result.

In the opinion of the investigators the apparent ability of this pine to withstand weevil attack is probably due to the vigor of the trees and their consequently heavy flow of sap. Weevil attack takes place in the second year of the trees' growth. At the time of attack many of the leading shoots are nearly an inch in diameter at the base, and by the end of the season some of them are as much as 1½ inches in diameter at the base.

Pitch droplets exuding from feeding or egg punctures are the first evidence of attack. The leaders that are killed have the wilted appearance characteristic of weeviled northern white pine leaders. On those that survive, the bark usually has a more or less roughened appearance and sometimes the feeding gallery of a larva is rather plainly outlined.

In recent years the "Riga" strain of Scotch pine has been planted rather extensively throughout the Northeastern States.

❧

The final report of the Society of American Foresters' committee on forest types is now available for distribution as a 48-page paper entitled "Forest-Cover Types of the Eastern United States." Copies may be obtained at 50 cents each from the Society of American Foresters, Hill Building, 839 Seventeenth Street, Washington, D. C.

Foreign Notes

Canadians Use Aerial Photographs in Reporting Fires

Aerial photographs are being used experimentally by the Canadian Department of the Interior as a means of reporting the location of forest fires. Stereoscopic oblique photographs were taken of four of the principal valleys in Banff Park, Alberta, from airplanes flying at an average height of 12,000 feet. A continuous series of 300 overlapping pictures was taken of the Bow, Cascade, Spray River, and Lake Minnewanka Valleys. The two sides of each of the first three valleys named were photographed separately, so that in series the pictures represent a strip of territory 110 miles long. The photographs are the standard 7 by 9 inch size. Under a strong glass they show details of the terrain very distinctly. The use of a stereoscope developed by the topographical survey of the Department of the Interior makes it possible to study changes of elevation and difference in forest types and to distinguish old burns, windfalls, and variations in the density of the forest stands.

One complete set of the pictures was retained at Ottawa, one was sent to Banff, and a third was divided among the wardens so that each warden has pictures of the area which he patrols. Each office and warden was supplied also with a celluloid grid the size of the photograph, divided into inch squares which are numbered along the top and lettered down the sides. Each photograph is individually numbered, and the corresponding numbers are shown on a contour map of the park. Thus a warden locating a fire can state the position in a few words by giving the photograph number and the cross reading of the grid. Use of the grid also facilitates reference to the location of water supplies, good fighting points, and means of approach for fire fighters, and makes it possible to report the progress of a fire to park headquarters or to Ottawa quickly and completely in a minimum of words.

❧

A forestry department has recently been created in the University of Stellenbosch, South Africa, headed by E. J. Neethling, a member of the 1923 class of the Yale School of Forestry. A school for the training of officers for the lower division of the South African Forest Service has been opened, likewise, at Saasveld, under the direction of S. J. Meiring. Mr. Meiring is a Yale forestry graduate of the 1926 class and has heretofore had charge of the Bloemfontain forestry district of South Africa.

❧

A Belgian law promulgated in December, 1931, empowers the Minister of Agriculture to limit the cutting of timber on private property when he considers this necessary for such purposes as to prevent soil erosion, to protect dunes, to safeguard public health, or to maintain water supplies. In the case of an even-aged mature forest the owner may be required to leave standing half the stand by volume, or at least 75 cubic meters of timber per hectare, and in the case of coppice with standards he may be required to leave 40 per cent of the stand by volume, or at least 25 cubic meters of timber per hectare.

* * *

Saskatchewan has created a commission on water conservation and afforestation and has made plans for a 10-year tree-planting program.

* * *

Individually paid memberships in the Canadian Forestry Association increased in 1931 by 2,001, although the number of memberships paid for in bulk fell off. The total number of members, which had stood at 32,008 in 1930, was 27,064 at the close of 1931.

* * *

Bark percentage at one-tenth tree height was found to be a better basis than bark percentage at breast height for determining the bark type of Scotch pine stands, in studies reported by Ivar Heijbel in Skogsvårdsföreningens Tidskrift (1929). Bark percentage at one-tenth tree height was constant for differ size classes and was comparable between trees different stands. The height at which rough b gave way to smooth bark varied with bark thick but not with tree diameter.

* * *

The task of compiling lists of the trees and shr to be found in various parts of the British Empir being carried forward by the Imperial Forestry In tute, Oxford University. The project is one of gr magnitude, owing to the vast number of the tree spec present in the tropical territories of Africa and As The Federated Malay States alone are said to cont more than 2,500 tree species.

* * *

Wood has been used to the exclusion of any ot construction material in all radio towers erected Germany in the past two or three years, it was stat at the February, 1932, meeting of the Deutsc Forstverein. Native Scotch pine and spruce are t species used. Besides having technical advanta owing to the insulating properties of wood, wood towers cost about 20 per cent less than those of steel

Personals

William W. Ashe, United States Forest Service inspector in the eastern district, died on March 18, 1932. In his sudden passing the service has lost one on whom it greatly relied. When the acquisition of land in the Eastern States for the establishment of national forests was first begun in 1911, Mr. Ashe's wide knowledge of forest conditions in his native South was immediately brought into the service of this project. Since that time his judgment has had a very large measure of influence in framing acquisition policies and determining the location of units to be purchased. Mr. Ashe's forestry career of 40 years began with training in the University of North Carolina and in Cornell University, and was identified with Government work from 1899. In the earlier years he made a number of silvicultural studies and assisted in preparing management plans for private timberlands. His whole career was pervaded by an intense interest in dendrology. Particularly in regard to the hardwoods of the South, he contributed in a very distinctive manner to the existing knowledge of American forest species. He was the author of many publications covering a wide range of forestry subjects, including, together with dendrology, forest management, utilization of forest products, and the effect of forests on streamflow and erosion. His bulletin on loblolly pine, published in 1915, is of outstanding value. In its completeness and authoritativeness it is typical of his work in each of the fields of his activity.

Three Americans and two Canadians have be selected by the Charles Lathrop Pack Forest Educati Board to receive fellowships awarded by the board f the year 1932. They are Weston Donehower, gradua student, department of forestry, Cornell Universit who will make a study of the management of red spru for pulpwood production in the Northeastern State John Edward Liersch, junior forester, British Columb Forest Service, who will demonstrate, through cooper tion with lumber companies, the practicability selective cutting in the Douglas fir region; Ral Melvin Lindgren, graduate student, University Wisconsin, who will study phases of forest patholog Harold John Lutz, graduate student, Yale Universit who will continue ecological study of the "plain areas of southern New Jersey which he began under Charles Lathrop Pack fellowship awarded in 193 with particular reference to the possible influence soil conditions on vegetational development; a Louis Rene Scheult, graduate student, University Toronto, who will make a study of the use of mot trucks in woods operations, with special reference conditions in Eastern Canada.

Paul H. Roberts, for several years supervisor of t Sitgreaves National Forest, Ariz., has been transferr to the Washington office of the United States Fore Service as administrative assistant in the branch research.

Sinclair A. Wilson has joined the staff of the Pacific orthwest Forest Experiment Station as a senior orest economist to conduct a study of tax-delinquent nds in Washington and Oregon. Mr. Sinclair was ained as a forester at the Oregon State College and as had special training in law and economics. He as president of the First National Bank of Linnton for 2 years. For some time he has served as chairman the forestry committee of the Portland Chamber of ommerce.

E. L. Mowat, who has engaged in advanced work at e University of California while on leave from the ake States Forest Experiment Station, has now been ansferred to the Intermountain Forest Experiment tation. His new work in the intermountain region as to do with the management of ponderosa pine.

F. G. Miller, dean of the school of forestry, Univer- ty of Idaho, is spending a semester of sabbatic leave European study and travel. After studying at the resden Technological University he planned to visit orest schools and forest regions in Germany, Switzer- nd, France, Sweden, Finland, and England.

Harold F. Morey has been transferred from the llegheny Forest Experiment Station to the North- astern Forest Experiment Station. Mr. Morey has een studying the growth of Allegheny hardwoods, and is work in the Northeast will be in large part a con- inuation of this activity.

G. M. DeJarnette has been transferred from the Missoula, Mont., headquarters of the United States Forest Service to the Northern Rocky Mountain Forest Experiment Station for work in connection with the Forest Survey.

William Hallin, junior forester on the Deschutes National Forest, Oreg., has been transferred to the California Forest Experiment Station to assist in the redwood and pine silvicultural studies.

C. B. Williams, lecturer in agricultural and forest entomology in the University of Edinburgh, has been appointed head of the department of entomology at the Rothamsted Experimental Station, England.

R. C. Hall is now assigned to the Central States Forest Experiment Station as consulting forest entomologist. The major project on which Doctor Hall is now working is a study of the locust borer.

Sir Roy Lister Robinson, technical commissioner in the British Forestry Commission, has been appointed to succeed Sir John Stirling-Maxwell as chairman of the commission.

Richard R. Fenska, formerly professor of forest engineering in the New York State College of Forestry, is now district manager for the F. A. Bartlett Tree Expert Co. at Northampton, Mass.

Bibliography

Stickel Reports on Fire-Weather Study

By G. H. Lentz, United States Forest Service

The results of five years' investigation of fire-weather onditions at Cranberry Lake, N. Y., have been pub- shed by the New York State College of Forestry, at yracuse, as Technical Publication No. 34.[2] The tudy was a joint project of the college and the North- astern Forest Experiment Station. In its first year, 925, it was financed in part by the Empire State orest Products Association. Paul W. Stickel, asso- iate silviculturist at the experiment station, organized he work in 1925 and closely supervised the work of he men who later made observations daily throughout he fire season—May to October, inclusive. During he years 1926 to 1929, inclusive, fire-weather reports ased on these observations were telegraphed daily to he New York State Department of Conservation, t Albany.

Stickel has admirably combined a technical description and discussion, of interest mainly to research agencies, with a presentation of facts and methods that have an immediate practical application. He describes in detail the methods and instruments used in the study, and explains how an organization engaged in preventing and suppressing fires may equip a field force to gather the data needed for forecasting periods of fire hazard. Our forest experiment stations have sometimes been criticized for not working on problems the solution of which would have an immediate practical application. The practicality of this experiment is well proved by the fact that several agencies are already applying its results.

It was found that the moisture content of duff and other forest fuels is an accurate index of their inflammability. When the duff moisture content is above 30 per cent there is usually no danger of fire, but when it drops below 10 per cent the fire hazard is serious. When the moisture content of the top layer of duff is 22 per cent or less there is great danger that discarded matches will start a fire; when it decreases to 16 per cent or less, pipe heels readily start fires; and when it sinks to 6 per cent or less, there is danger of fires being started by cigarettes.

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[2] Stickel, Paul W.: The Measurement and Interpretation of Forest ire Weather in the Western Adirondacks.

To determine fire hazard at a given time is not always so simple a matter as measuring the duff moisture content. The net results of the actions and reactions of six interdependent meteorological elements—temperature, humidity, precipitation, air pressure, wind velocity, and cloud formations—were studied, and are discussed by Stickel under the following headings: 1, Temperature factors—(*a*) air temperature, (*b*) duff temperature, and (*c*) soil temperature; 2, psychrometric factors—(*a*) relative humidity, (*b*) depression of dew point, and (*c*) vapor pressure; 3, solar radiation; 4, air pressure; 5, wind velocity and direction; 6, precipitation; 7, cloud formation; 8, evaporation; and 9, other elements. The effect of forest canopy on duff moisture content also was studied and is discussed.

By means of graphs, the relation of each of these factors to duff moisture is portrayed. With one exception these graphs are easily read and understood. In Figure 3, page 27, an attempt was made to put too many graphs on one page, with resultant loss of effectiveness; if the horizontal scale could have been doubled, the reader's eye might have followed the interwoven lines more easily.

The daily observations taken at 2 p. m. gave the most significant results; those taken at 11 a. m. were less valuable, and those taken at 8 a. m. and 5 p. m. were least valuable. If only one reading a day is possible it should be taken in the early part of the afternoon, but by all means it should be taken at the same time each day.

An analysis of the data showed that a satisfactory estimate of duff moisture content could be arrived at through a combination of three readily determined factors—evaporation per hour, hours since last measurable rainfall, and air temperature. Alignment charts based on these factors are presented.

It is well known that fires burn more readily on open or cut-over areas than in green or virgin timber. Stickel shows just how the forest canopy prevents a high fire hazard through its influence on temperature, wind, humidity, solar radiation, etc. This has a direct silvicultural application—on selectively logged areas the partial canopy left after the cutting keeps the forest fuels in a more moist condition, thus holding down the fire hazard.

In several appendices the various instruments used in the study are described and their purchase prices given. A bibliography lists 42 sources.

The bulletin contains 115 pages, including 13 tables, 10 plates, and 26 figures.

* * *

A partial list of references to published material dealing with soil erosion and its prevention has been prepared by Dorothy Graf, librarian, Bureau of Agricultural Engineering, United States Department of Agriculture, and has been mimeographed. Copies ca be obtained by writing to Mrs. Graf.

Afforestation in Southern Lands

By L. S. Gross, United States Forest Service

As the author of Afforestation in Southern Land E. Maxwell writes: "The object of this work is th it may be a general guide towards successful a forestation operations in southern lands—New Ze land, Australia, and South Africa—but more especial in New Zealand." This book of 308 pages not on deals with methods of planting and with nurse practice, but also includes a considerable discussi of the costs, objectives, and results of forestry practi in general.

The author advocates planting on areas of go soil conveniently located as to markets and deprecat the theory that only the poorer land should be devot to forestry. As essentials to the successful establis ment of plantations he stresses discrimination regard to source of seed, use of species mixtures, ca in planting, close spacing, management of plantatio (i. e., cleaning, thinning, pruning, protection fro fire, etc.) and, above all, experimentation. Thou laying down certain general rules for the conduct the work, he feels very strongly that each individu situation should be studied carefully and handled a way adapted to local requirements.

If northern white pine is to be used Mr. Maxw recommends that a spacing of 4 feet by 4 feet adopted. In general, he feels that any spacing wid than 6 feet by 6 feet is undesirable.

New Zealand was without any native conifers, b has obtained excellent results from planting a numb of exotic conifers. Chief among those recommend are "Insignis" (Monterey pine), "Macrocarpa" (Mo terey cypress), redwood, and "Oregon" (Doug fir). Monterey pine and Monterey cypress in pa ticular make extraordinary growth in New Zealan It is especially interesting to note that such go results have been obtained in New Zealand, as a in Australia, with these two species which in th native California are insignificant trees confined to very restricted range. Speaking of the Monter pine Mr. Maxwell says: "Diameter growth continu under favorable climatic and soil conditions, exce tionally until about the fiftieth year. At times much as 8 feet vertical growth is made in one ye but for a number of years during the vigorous grow period 4 to 5 feet is a fair average." A number native New Zealand and Australian hardwoods recommended for planting. The book includes scriptions of all these and also of certain species recommended.

Rotation ages vary from 25 to 40 or 50 years. period of 100 years is thought entirely too long justify the cost of planting.

Sawmill Waste and Its Utilization in British Columbia

By ALLEN H. HODGSON, United States Forest Service

The study of sawmill waste and its utilization in the orest regions of British Columbia that was commenced n 1928 by the Vancouver laboratory of the Forest Products Laboratories of Canada has recently been overed in a 56-page bulletin by J. H. Jenkins.[3]

For the purposes of the study the Province, containing a total area of 355,855 square miles of which some 56,500 square miles supports timber, was divided rst into the coast region and the interior region and ext into lumber-producing districts, namely, south oast, north coast, southern interior, and northern nterior. In 1928 the total lumber production for he Province was 2,286,409,000 feet board measure, he product of 314 active sawmills. Production by istricts was as follows: South coast, 1,908,002,000 eet; north coast, 89,569,000 feet; southern interior, 81,506,000 feet; and northern interior, 107,332,000 eet. The total log cut for 1928 was 3,206,904,000 eet, of which 1,604,941,000 feet was Douglas fir, 38,629,000 feet was cedar, 204,111,000 feet was spruce, 53,269,000 feet was western hemlock, and the remainder was made up of true firs, ponderosa pine, western white pine, jack pine, larch, and other species.

As a basis for comparison 13 sawmills and 4 cedar hingle mills in the coast region, 12 sawmills in the outhern interior district, and 5 sawmills in the northern nterior district were intensively studied from the tandpoint of waste and its utilization.

The bulletin presents a large quantity of statistical ata under the headings "Sizes of lumber, 4 feet long, ecoverable from slabwood waste," "Percentage of lear lumber, 4 feet long, recoverable from selected awmill waste," "Rectangular-shaped pieces of waste," "Volume of log converted into sawdust," "Percentage of log converted into slabwood and trims," "Kerf f saws in use at mills studied," and "Utilization of og in British Columbia sawmills," all of which data re summarized in the table "Average utilization in ach region." This table shows that in the southern oast region the Douglas fir mills convert 71 per cent f the log into green lumber, 12.9 per cent into slabwood and trim, and 16.1 per cent into sawdust, and he hemlock mills convert 66.8 per cent of the log into umber, 14.9 per cent into slabwood and trim, and 8.3 per cent into sawdust. The sawmills of the outhern interior district, sawing largely ponderosa pine, Douglas fir, larch, cedar, hemlock, and Engelmann spruce, convert 68.3 per cent of the log into umber, 15.7 per cent into slabwood and trim, and 6 per cent into sawdust, while the mills of the northern nterior district, cutting Engelmann spruce, convert 6.8 per cent of the log into lumber, 17 per cent into labwood and trim, and 16.2 per cent into sawdust.

It is estimated (on the basis of the 1928 cut) that the yearly production of sawmill waste in the mills of British Columbia is 106,483,000 cubic feet of wood (solid measure), of which 48,275,000 cubic feet is in the form of slabwood and trim and 58,208,000 cubic feet is in the form of sawdust. In 1928 the logs sawed by these mills totaled 2,196,880,000 board feet (log scale), or 358,350,000 cubic feet.

In this study the red cedar shingle mills were found to convert 48.6 per cent of the log into shingles, 35 per cent into sawdust, 7.8 per cent into splints (waste), and 8.6 per cent into spalts (waste). The volume of wood used by the British Columbia shingle industry in 1928 is estimated at 36,544,000 cubic feet, of which 17,756,000 cubic feet went into 2,399,499,000 shingles, 5,999,000 cubic feet went into waste wood (splints and spalts), and 12,789,000 cubic feet was converted into sawdust.

One phase of the mill-waste studies conducted in each forest region of British Columbia was to determine the volume of waste now being utilized. It was found that the present utilization of sawmill waste varied greatly among various districts and among individual sawmills in each district.

The principal uses to which sawmill waste in the Province is now being put are lath, shingle bands, and fuel. The quantities of these commodities made at British Columbia sawmills from sawmill waste in 1928, and their value, are estimated as follows: 118,193,000 pieces of lath, $403,060; 17,328,000 pieces of shingle bands, $46,162; and 192,275 cords of fuel, $364,833. The total estimated value of these items is $814,055; the lumber produced during the year was valued at $46,112,039.

In addition, some of the mills convert sawmill waste into pulpwood and pulp chips, snow fencing, and stock for coal-car doors.

Sawdust and shavings together with "hogged" sawmill waste wood are also sold by many of the mills as "hogged" fuel. Sawdust and shavings are the chief fuel used in developing power for sawmill operation.

All the sawmill waste not utilized as by-products or used in the production of domestic power is sent to the refuse burners. It is shown that the quantity of material thus destroyed as true waste varies from 2.4 per cent of the log (exclusive of bark) in the Douglas fir mills of the coast region to 15.2 per cent of the log (exclusive of bark) in the Engelmann spruce mills of the interior region.

There are other potential uses for mill waste in British Columbia, of which some are impracticable under present economic conditions and others have not been developed on account of lack of knowledge or of a suitable market. As the more promising of these uses Mr. Jenkins lists short-length lumber, wood flour, wood distillation products, briquettes, and wall and insulating board.

In conclusion Mr. Jenkins says "The Forest Products Laboratories of Canada are now investigating the possibilities of more profitably utilizing the sawmill waste of British Columbia and of reducing it to a minimum by improving methods of manufacture."

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[3] Canada Department of the Interior, Forest Service, Bulletin 83.

Pine Identification by Needles

By W. A. DAYTON, United States Forest Service

W. M. Harlow, who is instructor in wood technology at the New York State College of Forestry, has obtained and assembled in a handbook[4] the diagnostic characters of native and introduced pines as represented by leaf structure alone. This is the first time that such information has been keyed in manual form. The subject is of great scientific and practical interest. Taxonomically the work is invaluable, especially in view of the critical nature and immense economic importance of the genus Pinus and the extreme difficulty, or sometimes even impossibility, of satisfactorily identifying pine material without cones.

The work includes an index of common and scientific names, an introduction, a chapter on the general morphology and anatomy of pine needles, a key to the species based on needle structure, acknowledgments, bibliography, and an appendix giving methods of technique used in the study; more than half the work, however, consists of annotated plates of the beautiful microtome sections, which admirably illustrate the internal leaf structure of the 54 pines discussed. The booklet is attractively printed on glazed paper.

Slash Disposal in Pine Forests of the Northwest

By F. S. BAKER, University of California

In a bulletin[5] of 58 pages T. T. Munger and R. H. Westveld have covered the subject of slash disposal in the northwestern pine forests in a most complete and satisfactory manner. About half the bulletin is made up of a fundamental discussion of the physical and economic considerations governing slash disposal in general, with specific references to the northwestern pine region. The second half is a detailed discussion of all the different methods of treating slash that are commonly used at the present time. The silvicultural effects of each method are noted as well as the effect on soil and forage and on fire hazard. The costs of the different methods are also discussed.

The authors' most important conclusion, to my mind, is their insistence that the method of slash disposal must be flexible. We have been far too prone to say that in a certain region piling and burning is best another logging and scattering. It is becoming m clear all the time that such blanket statements are tenable and that the method of brush disposal must determined locally on very small areas in accorda with the various degrees of fire hazard, silvicultu conditions, objectives, time of the year, etc. flexible method allows the use of the cheapest met that is compatible with the objective sought.

Definite conclusions as to how reproduction affected by the layer of needles that accumulates on forest floor where slash is merely scattered or is disposed of in any way are impossible in the Pac Northwest, the authors state, because of the scantin of the data. Such data as are available seem to indic that undisposed slash favors both germination a survival of subsequent seedlings. G. A. Pearson cited as having found slash beneficial to reproduct except where rank herbaceous vegetation is prese Pearson also notes,[6] however, that, where the layer needles exceeds one-half inch in depth, germinat of ponderosa pine may be diminished, and states th on the whole, during the needle-mat period of ab five years the establishment of seedlings is retar rather than promoted. Bates, Hilton, and Krue also noted[7] that unburned slash hindered to some ext the germination and establishment of lodgepole pi The same thing has been noted in spruce and fir fore where, of course, the needle fall is much heavier th in open pine forests. Perhaps the better spring ra fall conditions in the Northwest tend to counter the repressive effect of a mat of needles on germinati Obviously, the matter needs further investigation.

Black Rock Soils Data To Be Correlat With Growth

Commenting on J. T. Auten's review in the Janua 1932, FOREST WORKER, of the bulletin Physical Pr erties of the Cove Soils on the Black Rock Fore Henry H. Tryon, director of the Black Rock Fore writes as follows: "Mr. Auten raises a point of cri cism which is, I think, quite justifiable and seems need a word of explanation. He expresses 'a des for some tangible connection between such an inves gation and forestry plans for the area.' Simultaneou with the field work of the soil survey we obtained formidable array of data on tree growth and associati of species. We are well equipped to carry out suggested correlation of soil conditions and grow but we were unable to combine this with the soil stu proper. The results will be forthcoming later on.'

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[4] The Identification of the Pines of the United States, Native and Introduced, by Needle Structure. New York State College of Forestry Technical Publication 32. April, 1931.

[5] Slash Disposal in the Western Yellow Pine Forests of Oregon and Washington. U. S. Department of Agriculture Technical Bulletin 259.

[6] Natural Reproduction of Western Yellow Pine in the Southw U. S. Department of Agriculture Bulletin 1105, p. 98.

[7] Journal of Agricultural Research, vol. 38, no. 4, pp. 229–243.

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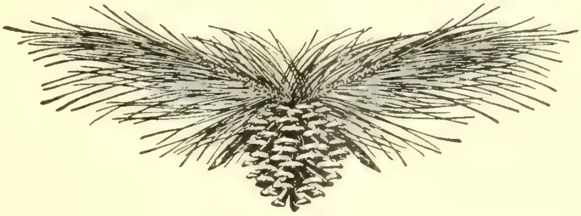

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Announcements

State Foresters to Meet in October

Preliminary notice has been received from C. P. Wilber, State forester of New Jersey and president of the Association of State Foresters, that the 1932 meeting of the association will be held in New Jersey, October 17, 18, and 19. Details of the program will be announced later. Following the meeting in New Jersey, members of the association will have the opportunity of making a brief survey of forests and forest work in New York State through arrangements made by W. G. Howard, superintendent of lands and forests of New York.

Congress of Forest Research Organizations

The International Union of Forest Research Organizations will hold a congress at Nancy, France, September 4 to 11, 1932. Several optional tours, before, during, and after the meetings at Nancy, have been arranged for members who wish to study at first hand the forest regions of France. The congress will be divided into six sections, meetings of which will be so scheduled as to enable members to follow the work of several sections. Discussions will be held in English, French, and German. The subjects of the sections are: Fo ecology and silviculture; forest utilization; tropical Mediterranean forest problems; reforestation and p vention of erosion in mountain regions; pedological climatological forestry; protection of forests, includ fire protection, forest pathology, and forest entomolo

The section of forest entomology planned to meet Nancy during the second half of July, immediat following the Fifth International Congress of En mology in Paris, for the convenience of memb desiring to attend both meetings.

Dedication of Louis Marshall Memor Building at Syracuse

November 18, 1932, has been approved as the d for the dedication of the Louis Marshall memo building at the New York State College of Forest Syracuse University, Syracuse, N. Y. It is expec that the building will be completed by that d Leading foresters of this country and abroad participate in the event, and the tentative progr includes several internationally known speak Samuel N. Spring, assistant dean of the college chairman of the committee on arrangements.

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State Forestry

New Fire-Suppression Policy in California

Forest fires in California during the season of 1932, on both State lands and national forests, will be fought by organized fire crews only, without resort to the employment by the hour of temporary fire fighters. Twenty crews of 20 men each will be regularly employed at a rate of $25 per month and board and will be located strategically through the State, with a foreman in charge of each crew wherever necessary. Additional help may be obtained by hiring crews already organized and employed by the State division of highways or by water, lumber, power, and other companies; in cases where still further help is needed, local citizens may be hired at 20 cents per hour and board; and State forest officers may hire a few men for initial attack upon fires before the organized suppression crew can arrive, at 25 cents per hour and board. These precautions have been made necessary by the number of incendiary fires set last year by unemployed men for the purpose of obtaining work fighting the fires.

The State board of forestry has divided the area of the State under its protection into three classes: (1) Areas of greatest state-wide importance, embracing watersheds, timber, and recreation; (2) areas not of state-wide importance but needing intensive protection to secure class 1 areas, and, in a few localities, areas where extensive protection must be given regardless of the threat to class 1 lands on account of cooperative agreements with counties and other local agencies who are supplying part of the funds; (3) areas not of general importance where protection should be provided by the local residents, including principally grass and grain lands, and areas where local protection is more a matter of community interest than a forest problem.

The zoning of the State into these three classes is progressing reasonably fast, about three-fourths of the entire area having been classified already. It is expected that numerous changes in exact zone boundaries will be made from time to time, but the general scheme is to be permanent.

The California State Chamber of Commerce, through a forest-fire emergency committee, is cooperating with the division of forestry and the United States Forest Service in organizing groups of citizens to help in the prevention of forest fires.

New York Adds 24,000 Acres to Forest Preserve

Announcement of the purchase of 24,000 acres of land to be added to the State's forest preserve has been made by the New York Conservation Department. One tract of 21,000 acres in northern Herkimer County, near the Beaver River, the largest block to be added to the preserve in recent years, is extensively wooded with virgin forests. The other tract consists of 3,000 acres, comprising Howland's Island in the Seneca River east of Seneca Falls in Cayuga County, Campbell or Busk Island, and a portion of mainland known as Bluff and Hard Points. This area is abandoned farm land, only partly wooded, and will be developed into a game refuge or public hunting ground.

"These purchases," said Conservation Commissioner Henry Morgenthau, jr., "show that although the State is obtaining large tracts of land outside of the forest preserve for reforestation purposes, it is not neglecting the preserve itself but is constantly increasing its extent."

Alabama Acquires New State Forest

A tract of approximately 5,000 acres has been donated to the State of Alabama for a State forest by the Jackson Lumber Co. The gift was made as a means of stimulating interest in timber production on nonagricultural lands in the State. Although the area, which lies in the western part of Geneva County, has been logged over, it contains a considerable amount of young growth. As a State forest it will be devoted to experiments in forestry methods of reestablishing and managing timber growth, and demonstrations of results.

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Forest Fires and Fire Protection in 1931

By A. B. Hastings, United States Forest Service

During the calendar year 1931, 186,894 forest fires burned over an area of 51,578,310 acres in the United States (exclusive of Alaska), according to statistics compiled by the Forest Service from reports and estimates received from States cooperating with the Federal Government in forest-fire control and from national-forest officers. Corresponding figures for 1930 are 190,980 fires and 52,266,460 acres burned over. Since much of the privately owned forest land in the country is not under any form of organized protection, data for such land have necessarily been compiled from rough approximations; the total area under protection in 1930 and 1931 was 227,500,000 acres, on which 61,854 fires burned over 6,378,340 acres in 1931, as against 70,832 fires and 5,809,000 acres in 1930. Of the total burned area, 88 per cent was unprotected.

The average area burned per fire on the protected area in 1931 was 103 acres, and in 1930, 82 acres; for the 5-year period 1926–1930 it was 100 acres. It is interesting to note that there was a marked decrease last year in the size of the average fire on protected areas in the Northeastern, Middle Atlantic, Southeastern, and Gulf groups of States.

Incendiarism is the reported cause of fires on 24.9 per cent of the area burned within protected units, in contrast to 17.1 per cent for the previous five years. Sharp increases in incendiarism are noted in the Southeastern, Gulf, Central, and Pacific States. Area burned by fires attributed to miscellaneous causes also increased, jumping from 10 per cent for the 5-year period to 15.7 per cent in 1931.

The $7,216,885 spent in the cooperative protection of State and privately owned lands from forest fires in the calendar year 1931 was from the following sources: States, $3,839,305; private owners, $1,844,638; the Federal Government, $1,532,942.

Reforestation Work in New York Exceeds Schedule

Planting work already done in New York exceeds the quota for the entire year under the State's reforestation program. On more than 20,000 acres of abandoned farm land, purchased under the provisions of the reforestation amendment passed by the legislature last November, more than 22,000,000 trees have been planted, according to reports received from all over the State by Conservation Commissioner Henry Morgenthau, jr. In this work employment was given for periods of two to six weeks each to more than 5,000 men selected from unemployment relief lists in the counties in which the planting was done.

In order to handle systematically the work of land acquisition, tree planting, and forest management of the plantations, the State has been divided by conservation department into 10 districts under following district foresters: R. H. Hick at Oneor C. E. Baker at Norwich; J. D. Kennedy at Cortla I. S. Bowlby at Bath; H. E. Dobbins at Jamesto G. M. Powell at Lowville; W. F. Pratt at Cant A. J. Woodford at Herkimer; C. P. Fatzinger Hudson Falls; and C. D. Kingsbury at Fleishmans.

East Mississippi Protective Associati

Landowners in eastern Mississippi have formed a forest-patrol association which, with State coop tion, will undertake fire-protection measures affect 145,000 acres of their property. Of this total 125, acres is owned by the Sumter Lumber Co., of Elec Mills, and about 20,000 acres is listed by the E Mississippi and West Alabama Game and Fish A ciation. The forest type is principally shortleaf, w some slash and longleaf areas. Approximately 90, acres of the Sumter Lumber Co. land has been over. In general this cut-over land now bears g stands of second-growth timber.

Rhode Island Passes Registration A

A law passed during the 1932 session of the Rh Island General Assembly requires that any pers firm, or corporation owning standing trees shall regi with the State bureau of forestry before cutting sawing such trees for other than domestic use. addition, sawmill operators shall report the locat of all sawmills to the forest warden of the town or in which they are to be operated. Through th requirements the bureau of forestry will be provi with more definite information on the annual cut wood products in the State, and will also be able obtain closer cooperation from sawmill operators the reduction of fire hazards.

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A marked difference between the condition of reproduction within those areas in Oklahoma syste atically protected from forest fires and that on unp tected areas has been observed by George R. Phill State forester of Oklahoma. According to Phillips young pines are getting a fine start on la areas inside the protected units, while outside th is practically no pine growth.

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Spring planting plans for the State and munici forests of Vermont called for approximately half million trees of various species, among which red and Norway spruce predominated. Eight Verm towns ordered a total of 110,500 trees for plant on municipal lands.

Timber Protective Association Disbands

After 26 years of cooperative timber protection work n Idaho, the Coeur d'Alene Timber Protective Association is disbanding because of the inability of many of the private lumber companies and individual timber owners who comprise its membership to continue to pay their proportionate shares of the cost of maintaining protection. The association, which has cooperated closely with the State forester of Idaho and the Federal Forest Service in protecting its members' lands from ire, was the oldest of its kind in the United States. Efforts to protect the area will be continued by State Forester Ben. E. Bush, the State Land Board, and the Forest Service.

Maryland Administers Safety-Strip Law

Railroad companies which failed to comply with the Maryland law that requires them to clean 100-foot safety strips along their lines within hazard areas before the fire season begins were obliged this spring to send a motor-car patrol equipped with fire-fighting tools within 5 minutes behind each train operating through these areas, or face court action. Patrols were prompty supplied by the several companies notified, and cleaning of the safety strips was immediately begun.

The Maryland Department of Forestry administers this law, which was passed in 1924 and provides for ines for companies not complying with its requirements. Careful inspections were made of all the rights of way by district foresters and district forest wardens before the railroads were requested to supply the patrol.

Increased Production and Distribution of Planting Stock by States in 1931

A substantial increase in 1931 over any previous year n the production and distribution by the States of forest planting stock is shown in official reports received by the United States Forest Service. During the past year 102,856,770 young trees were produced and distributed by the 38 States which were engaged in this activity and Hawaii and Puerto Rico. This total represents an increase of nearly 30 per cent over the 79,319,629 trees distributed in 1930, and doubles the distribution of five years ago, only 56,000,000 trees having been distributed in 1927.

In 1931 the forest trees provided by the States, in cooperation with the Federal Government, for planting on farms numbered 25,510,052, less than the number used for this purpose in 1930 by 326,163. Trees distributed for planting on lands other than farms increased somewhat in number, with 24,839,109 in 1931 against 23,039,760 in 1930. The large increase in the total over that for the preceding year is accounted for mainly by the greater number of trees produced for planting on State lands, 52,507,609 having been used for such work in 1931, or 22,063,955 more than in 1930.

Again, as in previous years, New York led in number of trees distributed with a total of 41,211,500, an increase of 16,250,800 over 1930 and of 15,843,800 over 1929; Michigan, in second place, a position held also for several years, reported 23,871,248. Pennsylvania led in the distribution to farmers with 6,028,835 trees. New York and Michigan together planted 43,000,000 trees on their State forests, the number being almost evenly divided between them.

Total distributions of more than a million trees each were made by Pennsylvania, with 8,646,394; Wisconsin, 3,863,300; Ohio, 3,572,055; Massachusetts, 3,289,325; Connecticut, 2,075,703; Indiana, 2,042,100; Vermont, 1,399,525; Puerto Rico, 1,393,400; New Jersey, 1,264,925; and New Hampshire, 1,209,420.

Expenditures by the States for the production and distribution of planting stock during 1931 amounted to $679,540, including $93,334 contributed by the Federal Government under the Clarke-McNary law.

Wisconsin Builds New Fire Towers

Twenty-nine new fire towers, seventeen for new locations and twelve for replacements, are to be constructed in Wisconsin this year. Ten were completed in March and April and used during the spring fire season. The towers, which will vary in height from 68 to 100 feet, are of a new design which combines the best features of State and Federal towers already in use and introduces a number of improvements. Four smaller additional towers will be erected with material salvaged from those torn down. Some of the labor used in this work has been employed under the $500,000 unemployment relief program of the State.

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Three days of unusual forest fire weather in Texas this spring, March 20 to 22, caused the burning by 300 fires of approximately 25,000 acres of forest land during that short period. For the entire fire season, however, the average size of the individual fire was reduced from 76 acres in 1930 to 46 acres in 1932, with the total acreage burned reduced by 26,000 acres. W. E. White, chief of the division of forest protection of Texas, attributes these reductions to the improved system of lookouts and telephone lines established since last year.

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The city of Rutland, Vt., has been doing intensive work on its 3,500 acres of municipal forest and also on a large wooded area within the limits of the city. During the winter work was given to unemployed men who, under the supervision of W. E. Bradder, district forester, cut fire lines and thinned out worthless brush.

Georgia Establishes New State Nursery

Under the direction of H. M. Sebring and H. D. Story, jr., district foresters, the division of forestry of the Georgia Department of Forestry and Geological Development established a new State tree nursery at Albany, Ga., this spring. A 6-inch well was dug by the city of Albany through the cooperation of the chamber of commerce, and the division of forestry installed a pump and an overhead sprinkling system. Ninety seed beds, covering a little more than an acre of an old field, were prepared and seeded. Eitel Bauer was appointed superintendent of the nursery.

Board of Fire Review for Connecticut

Believing that valuable suggestions might be obtained through study by impartial investigators of the handling by his department of bad forest fires, A. F. Hawes, State forester of Connecticut, appointed a board of fire review to serve during the 1932 fire season. The members of the board, none of whom is connected with the State department of forestry, are: Robert M. Ross, secretary of the Connecticut Forest and Park Association; W. O. Filley, forester of the Connecticut Agricultural Experiment Station; R. C. Hawley, professor at the Yale School of Forestry; C. R. Tillotson, district inspector, United States Forest Service; J. A. Gibbs, Connecticut extension forester; and Charles L. Gold, farmer, of Cornwall, Conn.

The first fire investigated by the board burned approximately 250 acres on the Cockaponset State Forest. The area was inspected by members of the board and the following recommendations were made: That the crews be commended for effective handling of the fire under difficult conditions; that an auxiliary lookout station be established on one of the higher points of the forest, and that it be equipped with temporary telephone and manned on days when there is great fire danger; that the State provide enough power pumps so that there will be at least one available in each county; that the attention of the officials of the town of Haddam be called to the fact that the Old County Road was flooded by the Turkey Hill Reservoir, making it impossible for the fire truck to get through to
head of the fire from the east and causing much v
able time to be lost and additional land burned beca
the truck had to make a circuit of about 6 miles
poor roads.

Chinese Trees Recommended for Planti in Louisiana

Growing of tung-oil trees on portions of the cut-
lands in the State is recommended by the divisio
forestry of the Department of Conservation
Louisiana. The oil extracted from the nut of
Chinese tree has many uses and brings a high p
Experiments in the cultivation of this species h
been made by the division of forestry, the G
Southern Lumber Co., and individual farmers
landowners with encouraging results. It promise
be of considerable value as a supplementary crop.

Work Record of California Unempl ment Camps

At least $40,000 worth of work was accomplis
by men in the 10 unemployment camps maintaine
California within and adjacent to national forest
the State during the past winter. The work, w
was done under the supervision of national-fo
officers in cooperation with State authorities, amour
to 36,196 total man-days of six hours each. More t
91 miles of road were cleared; 12.3 miles of new r
were built; 15.1 miles of firebreaks were construc
32.45 miles of telephone lines were built; 2,610 s
and 516 infested trees were felled; 10,000 trees
planted; and in addition many miles of existing ro
firebreaks, and telephone lines were maintained in g
condition.

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The Oregon State Forestry Department has rece
adopted a badge to be worn by its employees. It i
bright copper, shield shaped, with the State seal in
center.

Education and Extension

Syracuse Summer School Offers Forestry Courses

In response to a demand from many of the teachers attending the Syracuse University Summer School sessions, particularly those interested in biology, geography, and social sciences, a course in forestry has been inaugurated this year under the auspices of the New York State College of Forestry. Joseph S. Ill
head of the department of forest management of
college, will be in charge of the summer work.
courses to be offered are, briefly: General fores
identification, life history, ecology, and use of tree
the Eastern States; and instruction and practical tr
ing in planting and care of trees, including nurs
practice. The session will be held July 5 to August

Fence Posts Tested at Missouri Experiment Station

Tests conducted by J. C. Wooley at the Missouri Agricultural Experiment Station on fence posts of different species of wood, both treated with preservatives and untreated, established the superior serviceability in the untreated class of white cedar, osage orange, black locust, and catalpa. Untreated posts of these four woods were found to be still serviceable after 18 years of use.

The serviceable life of some of the species tested was lengthened by treatment with creosote, as shown in the following table:

Species	Service, untreated	Service, treated
	Years	*Years*
Sassafras	14	[1] 18
White oak	12	[1] 18
White walnut	11	14
Redbud	10	14
Black walnut	9	[1] 18
Black ash	7	[1] 18
Honey locust	5	[1] 18
Red oak	3	13
Black oak	3	12

[1] Some posts still serviceable.

White cedar posts which had been given a 5-hour, double-tank treatment with creosote were solid at the end of the 18-year period, but the sapwood of other treated posts was more or less rotted.

Pines and Spruces in Wooster Arboretum

Trees growing in the forest arboretum of the Ohio Agricultural Experiment Station at Wooster, Ohio, include 19 species of native pines, 13 species and 6 varieties of exotic pines, 6 species of native spruces, and 12 species and 8 varieties of exotic spruces. Pines growing in permanent location are *Pinus balfouriana, P. banksiana, P. bungeana, P. cembra, P. edulis, P. contorta, P. densiflora, P. echinata, P. excelsa, P. flexilis, P. jeffreyi, P. koraiensis, P. mugo* (syn. *P. montana*), *P. mugo mughus, P. mugo pumilio, P. nigra, P. nigra calabrica, P. parviflora, P. peuce, P. ponderosa, P. pungens, P. resinosa, P. rigida, P. strobus, P. sylvestris, P. sylvestris rigensis, P. tabulaeformis* (syn. *P. sinensis*), *P. taeda, P. thunbergii, P. virginiana;* additional species and varieties of pines growing in the nursery are *P. albicaulis, P. cembra sibirica, P. densiflora globosa, P. monticola, P. aristata, P. attenuata, P. pumila,* and *P. sabiniana.* Spruces in permanent location are *Picea abies* (syn. *P. excelsa*), *P. abies inversa, P. abies procumbens, P. abies pyramidata, P. bicolor* (syn. *P. alcockina*), *P. engelmannii, P. glauca, P. glauca albertiana, P. glauca coerulea, P. jezoensis, P. koyamai, P. likiangensis, P. mariana, P. omorika, P. orientalis, P. polita, P. pungens, P. pungens glauca, P. pungens kosteriana, P. rubra,* and *P. sitchensis;* others in the nursery are *P. asperata, P. jezoensis hondoensis, P. schrenkiana, P. smithiana,* and *P. wilsonii.*

New 4-H Forestry Clubs Organized in Vermont

One group of girls and eight groups of boys organized new forestry clubs in Vermont under the direction of 4-H club agents during the past winter and spring. The girls' club, at Randolph Center, in Orange County, is the second group of girls in the State to take up forestry as a project, the first having been organized in Orleans County. The recently formed boys' clubs are located in North Randolph, Orange County; West Hartford and Norwich, in Windsor County; Peacham and Waterford, in Caledonia County; Brattleboro, Windham County; Richmond, Chittenden County; and one in Orleans County.

The first year's work of a 4-H forestry club member in Vermont consists of identification of at least 15 common trees of the State, and collecting and mounting of the twigs, buds, leaves, seed, and wood of these trees.

Colorado Forest School to be Discontinued

Ending a career of over 25 years, the Colorado School of Forestry of Colorado College will be closed in June, 1934. This decision was reached by the trustees of the college partly in consideration of the financial burden of maintaining the school, which is not self-supporting, and partly in line with a recent reorganization plan under which other technical courses of the college will also be eliminated. No new students are being accepted for the forestry course.

One of the earliest forest schools to be established in the United States, the Colorado School of Forestry has since 1906 had the benefits of ownership of more than 6,000 acres of ponderosa pine timber, located in the mountains near Colorado Springs. This tract, known as the Manitou Forest, was presented to Colorado College by Gen. William J. Palmer and Dr. William A. Bell, and has contributed a small amount of revenue through sales of timber as well as providing a field laboratory for the students. It is expected that ownership of the forest will be retained by the college.

* * *

Interest in planting black walnut trees is growing among 4-H club boys of Lincoln County, N. C., who, after setting out 2,100 seedlings of this species, have requested 200 more.

Tree Planting on Farms Stressed in North Dakota Extension Program

Encouraging the North Dakota farmer to plant windbreaks and shelter belts and reforest woodlands on his farm is the primary project of Extension Forester John Taylor for the coming year. Of the 70,000 farms in the State fewer than 40 per cent have adequate shelter plantings, according to Mr. Taylor, yet in North Dakota trees are necessary to protect growing crops from the hot westerly winds of summer prevalent in that region and buildings and livestock from the cold winds and drifting snows of winter. It has been shown that a good windbreak gives protection to a zone 20 times the height of the trees on the leeward side and 10 times the height of the trees on the windward side. Crops protected by shelter belts have been found to consistently outyield those unprotected. Farmers desiring to plant trees will be instructed as to appropriate species, proper planting methods, and the necessity for cultivation and protection of the trees. The advice to be given by the extension forester is based on 594 demonstration plantings in the State.

The 657,742 acres of farm woodlands in North Dakota[1] include only 1.4 per cent of the total farm land and produce no timber of good lumber quality, yet cordwood, posts, poles, and rough lumber worth $300,000 are cut from these lands annually. Sixty per cent of the farm woods are used for pasture, and large areas are burned over every year as a result of carelessness in burning hay stubble, brush, and grass, says Mr. Taylor. His second project, therefore, is education of the owners of farm forests as to the destructive results of fires, grazing, and erosion, and the increased tree growth to be obtained through protection of the woods.

A third extension problem which will receive attention is development of new marketing ideas and methods. There is great need for dissemination among North Dakota farmers of information concerning the possibilities of farm forestry as a source of additional income.

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Distribution of 951,000 forest tree seedlings and transplants to 3,500 Nebraska farmers in all counties of the State during the spring of 1932 is reported by Clayton W. Watkins, extension forester. The trees were to be planted for windbreaks and for farm woodlot demonstrations. Among the 16 species distributed, Chinese elm predominated, followed by Austrian, Scotch, and jack pines.

Boy Scout Forests for Florida

In cooperation with the Florida Lumber & Millw Association and the Boy Scout organization of State, the Florida Forest Service has planned educational forestry project which calls for the est lishment of forests by scout troops. Each troop wi ing to participate in the project must obtain the use 25 to 40 acres of forest land on which firebreaks m be maintained and fires suppressed. The aid of lo residents is to be enlisted in preventing fires. Anotl requirement is that 2 to 5 acres of the forest must planted by the boys with forest tree seedlings. T scout in each troop who performs outstanding w will be sent to a Boy Scout camp for one week by t Florida Lumber & Millwork Association. Fire-fighti equipment and tree seedlings will be furnished by t State forest service.

County Fairs in New York State to E hibit Forest Plantations

Permanent forest plantations will be on exhibiti at 20 county fairs to be held in New York State tl summer and fall. Arrangements have been ma with managers of the fairs by George E. Steve exhibit specialist of the New York Conservati Department, for areas of one-fourth to one-half ac to be set aside in the fair grounds as demonstrati plots on each of which three to four hundred you trees planted by the conservation department will pr vide exhibits of forest growth. The trees, chiefly re white, and Scotch pines, Norway spruce, and Europe larch, will be carefully identified for the benefit visitors.

* * *

Two colleges in New England planted more th 150,000 trees on their forest lands this spring. Middl bury College, in Vermont, required 25,000 Norw spruce transplants to fill in small areas in its 30,0 acres of school forest. Lasell Junior College, Auburndale, Mass., planted 125,000 trees of five diffe ent species in a forest of 1,400 acres owned by tl college in Barnard and Stockbridge, Vt. Over a milli trees have now been set out on this area. The sto for these plantings was obtained from the Vermo Forest Service nursery.

* * *

A "prefreshman" camp has been established by th New York State College of Forestry with the obje of making earlier working contacts with prospecti students and as a practical introduction to forestr The camp will be held at the summer camping site the college on Cranberry Lake, N. Y.

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[1] Agricultural census of 1930.

Forest Service Notes

ederal Policy Relating to Controlled Burning in Longleaf Pine Region

A policy concerning the use of controlled fires for ecific purposes in the longleaf pine region has been rmulated by the Forest Service. The statement tting forth this policy, although intended primarily r the use of State forestry departments cooperating ith the Federal Government under section 2 of the larke-McNary Act, is of general interest to foresters. is as follows:

Controlled burning or controlled fire, as used in this atement of policy, is systematic, prearranged burning, refully performed at such times and in such a manner at the least practicable damage is done and that the e can be confined to the specific area which the owner esires to burn. As used in this discussion, the term controlled burning" does not apply to the burning of rebreaks.

Practically all of the land cooperatively protected nder the Clarke-McNary law is in private ownership. he uses to which it will be put will be determined rgely by the private owners. Public officials may roperly advise forest-land owners as to the use they hould make of the land and as to the methods of anagement best calculated to get the desired returns. several States in the South large areas of cut-over nds are reverting to the States because of nonpayment taxes. These States are confronted with the prob- m of managing cut-over land in State ownership.

The Forest Service views on the subject of the effect fire on the various forms of forest land use and the orest Service policy on cooperation under section 2 of e Clarke-McNary law where controlled burning is volved, are here stated. It should be understood at the statements refer only to the longleaf and the ngleaf-slash pine types. There seems to be no need this time for a statement covering the other timber pes where complete exclusion of fire is commonly cognized as necessary.

ONTROLLED BURNING FOR SILVICULTURAL PURPOSES

In the opinion of some foresters fire may be used to dvantage under certain conditions and for the follow- g purposes in establishing and managing longleaf ine stands:

(*a*) To burn off heavy accumulation of dead grass nd litter prior to seed fall so as to permit more of the eed to reach the soil;

(*b*) To reduce competition from undesirable grasses r vegetative growth following longleaf establishment;

(*c*) As a means of control for the brown-spot needle isease.

The practical application of controlled burning for he above silvicultural purposes has been demonstrated nly on very small areas. Granting that under certain onditions fire may accomplish these purposes, diffi- ulty must be expected in securing this gain without at he same time incurring even greater loss. With respect to the tree growth alone, this loss consists of decreased annual growth, killing of seedlings, especially in the cotyledon stage, defect originating in fire scars, and increased susceptibility to insect attacks. It must be kept in mind, too, that conditions in the longleaf type are not uniform over more than small areas; therefore, it is extremely difficult to apply fire to areas where its effect might be beneficial without at the same time burning adjoining or intermingled areas where the effect would be harmful.

CONTROLLED BURNING FOR FOREST PROTECTION

It is obvious that fire destroys inflammable material on the ground or temporarily reduces the amount of such material. A controlled fire in early winter eliminates the risk of a more severe accidental fire during the remainder of the winter and reduces the hazard during the following growing season. It does not insure immunity from fire for the entire year following the burn.

The justification claimed for controlled protective burning in the longleaf type lies in the fact that in many localities fire protection is not yet fully established and consequently, during bad fire seasons, the risk of accidental fires may be greater than the forest-land owner feels he can assume, particularly when a considerable investment is involved, as in turpentine operations. The owner, therefore, may choose to accept the losses incident to controlled burning as an insurance against greater possible losses.

There are, however, many disadvantages and objections to protective burning which indicate its undesirability even in the longleaf pine type. If done in a manner to minimize damage it may be as expensive as complete protection, and it has no justification, from the point of view of protection, if adequate protection can be had at reasonable cost without burning. Protective burning, even though carefully handled, is likely to be misunderstood by the general public. Many do not recognize the difference between it and indiscriminate, uncontrolled burning. The practice of controlled burning may tend, therefore, to perpetuate the custom of indiscriminate burning.

INFLUENCING FACTS

1. The fire laws now in force in the Southern States allow the landowner to burn his own forest land, and no burning permit is required. It is unlawful to burn land belonging to others.

2. There is no season of the year when fires will not burn in the longleaf and longleaf-slash pine types. Fire danger exists in varying degrees for 12 months in the year, although the main fire season normally occurs in the late fall, winter, and early spring. The same area has been known to burn twice within a 12-month period.

CONTROLLED BURNING ON AREAS COOPERATIVELY PROTECTED UNDER THE CLARKE-M'NARY LAW

The use of controlled fire by a cooperator will disqualify the area in question for Clarke-McNary law recognition except in the cases 1 to 3 cited below. These exceptions will be made only when such action is desired by the State forester. The following procedure has been tentatively set up for handling all permitted burning:

The owner should first establish and make known to the State forester his forest land use policy or plan. A written plan will be required by the State forester from the cooperator in every case where he plans to practice controlled burning in a protection unit, showing specifically the owner's reason for burning, subsequent protection desired, frequency of future burning, manner in which all burning will be performed, and location of the area to be burned.

If the plan submitted is approved by the State forester, he will issue a written permit to the owner covering the conditions under which the burning is to be done. No burning shall be done prior to the issuance of the permit. No part of the cost of burning will be paid by the State. The State forester shall, however, take such steps as may be necessary to satisfy himself that the burning is carried through in accordance with the provisions of the permit and in such manner as to safeguard adjoining lands.

In all cases of controlled burning full responsibility for damage must be borne by the owner.

USES OF FIRE WHICH WILL NOT DISQUALIFY AREA FOR FEDERAL COOPERATION

Case 1. Silvicultural burning. Silvicultural burning is here defined as the careful and intelligent use of fire as an aid in the establishment of longleaf reproduction or in the care thereof.

If a cooperating forest-land owner in the longleaf pine type wishes to make use of fire in the management of his forest properties he will first apply to the State forester for a permit, following the procedure outlined above. If the State forester approves the applicant's plan and issues a permit, the burning may be done by the owner without disqualifying the acreage for inclusion within a protection unit. The Federal Government will not share in any part of the cost of silvicultural burning. Even though the desirability from a silvicultural standpoint be established, the Federal Government under section 2 of the Clarke-McNary law would have no legal authority to participate. Subsequent protection would be afforded under the regularly established plan of cooperative protection with the Federal Government participating.

Case 2. Protective burning. This refers to broadcast controlled burning in the longleaf and longleaf-slash pine types as a protective or insurance measure.

Until protection is more fully established, if a cooperating forest owner wishes to burn his land for protective purposes and the State forester approves the plan and issues a permit, as above specified, the area will not necessarily be disqualified for inclusion in the cooperative protective unit on account of such burning.

Case 3. The use of controlled fire on only a portion of the owner's forest-type lands for the purpose of improving game production or grazing values but with complete protection desired for the remaining area. If a cooperating owner desires to have his forest land retained in a cooperative protection unit but wishes to burn parts of the area for special purposes, and if the State desires to issue to him a permit, as outlined above, the unburned area will not be disqualified for inclusion in the cooperative protection unit. The areas burned, however, will be so disqualified unless they are so small and so intermingled with the other land that a practical separation can not be made.

DISQUALIFYING USE OF FIRE

When the owner's policy is to promote a prim land use which is not timber production althou timber production is his second management purp and when he desires to burn the entire area in or to promote some other activity, such as grazing quail culture, as the primary use, Federal money not be used for protection. The Federal approp tion under section 2 of the Clarke-McNary Act is promote protection from fire for the purpose of grow timber. Burning for grazing or for quail is not belie to be in accord with best protection and timb growing practice, and therefore the use of Fede forest fire protection money is not justified.

Where the owner's policy does not contempl timber growing even as a secondary use, and where desires to burn to promote the other uses, the a obviously is disqualified for cooperative protection

An unpermitted burning by an owner will disqual the land of the owner for cooperative protection.

WOODS FIRES AND GRAZING FOR LIVESTOCK

Experiments conducted at the McNeill, Mi Experiment Station have indicated that annual win burning of native range grasses was beneficial to cattle grazed on such range, under the forest past conditions existing at that station and under methods of livestock management there practice The extent to which these results are applicable other portions of the longleaf belt or under differe methods of livestock management has not yet be determined. This is a matter on which widely va ing opinions are held by stock owners and othe Until more facts are available on which to base jud ment, Forest Service officers will not attempt to pa on the general applicability of the McNeill Expe ment Station findings relating to effects of fire on liv stock production or as to the desirability or undesi ability of woods burning for this purpose. They m properly express their opinions on this point if the advice is directly sought by a landowner who desir to use his land for both livestock and timber producti and the desirable treatment for one use seems to be conflict with desirable treatment for the other. Wh such requests are received the desirable course will to consider them with Bureau of Animal Indust officials and, if possible, arrive at a joint answer.

WOODS FIRES AND GAME BIRD PROPAGATION

Studies conducted by H. L. Stoddard have demo strated that under conditions existing in parts of t southern pine belt, the burning of dry grass, brush, an litter is sometimes desirable for quail propagation b that broadcast or general annual burning is not desi able. (See ch. 15, The Use and Abuse of Fire o Southern Quail Preserves, in Mr. Stoddard's book e titled "The Bobwhite Quail.") The position to b taken by Federal forest officers on this subject is state in case 3 and in the paragraph which follows the trea ment of case 3.

EFFECTS OF WOODS FIRES ON EROSION, REGULATION O STREAMFLOW, AND SOIL IMPROVEMEN

There are no available data to indicate that destruc tion of forest litter, trees, and other plant growth b fire is not inimical to erosion control and streamflo regulation in the southern pine belt, as elsewhere Very little data are available, however, by which t measure such damage.

There is likewise little evidence as to the effects of outhern woods fires on soil fertility. Studies now nder way by the Southern and Appalachian Forest xperiment Stations will be so prosecuted as to supply ome of the needed evidence on these subjects at the arliest practicable date. It is not advisable, until uch evidence is secured, to discuss erosion due to urning in terms of dollars, or of quantity of soil lost, eyond quoting anything which may be known as to ndividual areas on which these facts have been deterined or applying these facts to other individual areas hat are sufficiently similar to warrant a direct omparison.

OLICY ON COOPERATIVE PROTECTION OF DENUDED AREAS

In no southern State are present funds sufficient to rovide for the protection of all forest lands that need rotection. Therefore, from the standpoint of returns n funds invested, it will be considered of primary imortance to have Federal protection funds spent on rest lands that are now restocked or that clearly how the possibility of soon becoming so. This does ot mean, however, that there is any change in the osition relating to the necessity for state-wide fire revention educational work or, in some instances, for tensive provision of fire control for such areas.

NEED FOR CONSERVATISM

A large part of the forest-fire damage in the South a result of intentional burning. Vast effort has been pended in fire prevention educational work, and much rogress has been made. In all parts of the South here are stockmen, farmers, and forest-land owners ho once favored the use of fire but who are now advoates of complete protection. The various effects of ontrolled burning of forest lands have not yet been lly demonstrated, and in fact remain largely unknown. controlled buring policy should not be indorsed or dopted unless, or until, it is well established as a esirable practice in timber growing. Until considerbly more is known about the controlled use of fire as a art of timber growing practices, both Federal and tate forest officers should be extremely cautious in onsidering the owners' plans for controlled burning. ll forest protection policies must be based upon the fects of fire in the establishment, growth, and proper anagement of forest stands.

mprovements in Field Telephone Equipment Notable

By W. B. Osborne, United States Forest Service

Efforts to develop better field telephone equipment the Pacific Northwest region have resulted in at ast three important improvements. A new portable lephone has been perfected by C. M. Allen, telephone ngineer of Region 6 of the Forest Service, which, while osting less than half as much, has about twice the lking and signaling range of the set now in use. Its luminum shell is made up in two parts, and its echanism is standard and easily accessible for repair nd adjustment.

A new emergency wire having an insulation 400 per ent greater than the old cotton-wound wire has been made up to special Forest Service specifications. It is a stranded, hard-drawn wire, cotton wrapped and covered by a $\frac{1}{64}$-inch layer of 70 per cent pure latex rubber, with a top braid of cotton impregnated with moisture-proof compound. Ten to 15 miles of this wire can be attached to the main system without undue load, while 3 or 4 miles of the old wire was sometimes prohibitive. The wire weighs 33 pounds per mile, including spools, and has a breaking strength of 65 pounds.

To replace the iron-wire type of model A telephone which weighs about 100 pounds, a new model with a cast aluminum case and weighing only 30 pounds has been designed. Suited to transportation without packing or padding, it is particularly well adapted for use in fire camps.

Disk Device Saves Time in Seeding Nursery Beds

One step of the usual seed-sowing procedure is eliminated by the use of a disking device tried out last year in sowing Norway pine at the Beal Nursery, on the Huron National Forest, Mich. Attached behind the drill, this device adequately covers the seed with sand, making it unnecessary to scatter a layer of sand over the seed bed as has been the practice when a roller was used to press drill-sown seed into the soil. The disks work in pairs, each pair covering a row of seed. They are made of heavy galvanized iron and are about 4 inches in diameter. Old tire-valve stems bored out with a one-fourth inch drill were used as hubs.

In order that the disks might cover the seed evenly, spots of soil that would otherwise have remained rather hard were loosened with a rake before the leveler was used in preparation for the sowing. Because drill spouts often become clogged, especially on areas where roots of trees that have recently been dug remain in the soil, a man walked behind the drill and when there appeared to be danger of such clogging jerked up the drill shoes by means of a chain attached to each end. The ridges of dirt left by the disks were flattened with a roller.

Following this procedure, in 4 hours' time 10 men raked, leveled, sowed, rolled, and treated with acid 16,560 square feet of seed beds. At this rate such a crew can complete a 2-acre sowing job, including putting on the mulch and wire, in about four days.

New Address of Northeastern Station

Having completed its move from Amherst, Mass., the Northeastern Forest Experiment Station of the Forest Service may now be addressed at 335 Prospect Street, New Haven, Conn., where offices and laboratories have been provided by Yale University.

Standards for Timber-Management Plans Are Rising

By Howard Hopkins, United States Forest Service

The first timber-management plan of the United States Forest Service was approved by the Forester in 1920. An inventory of timber-management plans and timber-policy statements approved by the Forester and in effect on January 1, 1932, showed 119 policy statements and 135 management plans. The policy statements covered 99,561,201 acres of the gross national-forest area, or 83,938,606 acres of the net national-forest area; approved management plans covered 25,188,620 acres of the gross and 21,478,919 acres of the net area. The résumé showed that 76 per cent of the 163,854,517-acre gross area of national forests in the United States, and 75.6 per cent of their total net area, is covered by approved timber-management plans or policy statements.

It is estimated that these approved timber-policy statements cover 286,462,688,000 board feet of Government timber and that the timber-management plans control the handling of an additional 96,025,764,000 board feet of national-forest timber.

Most of the approved timber-policy statements and management plans provide for revision at the end of each budget period, usually 10 years. Without such revision the plans and statements would gradually become obsolete, because of changes in policies and the constant increase of knowledge regarding growth and yield of the many species and types on cut-over areas. Plans declared excellent five or more years ago would now, in most cases, be considered unfit for the Forester's approval. A review of the present effective timber plans and statements shows that, despite revisions, just less than 50 per cent (on an area basis) are satisfactory according to present-day standards.

The present inadequacy of the timber plans of 5 or 10 years ago indicates clearly the value of the cut-over cruises, growth studies, etc., so laboriously made by research and administrative men. It is the painstaking daily "grubbing" after facts, sometimes appearing so unending and so useless, that makes it possible to build better management plans and policy statements for the control of national-forest timber.

New Grade Stick for Hardwood Producers

A hardwood grade stick has been devised by the Forest Products Laboratory in collaboration with the National Hardwood Lumber Association to be used as a guide in the production of maximum grades of hardwood lumber by small sawmill operators. Paper charts containing the necessary data, with instructions for pasting on sticks and using, have been prepared for distribution, and a limited number of single copies can be obtained free upon application to the laborat at Madison, Wis. If a large number of copies desired there will be a charge of 5 cents for each cc

Hardwood lumber is graded on the basis of the portion of the total surface measure of the board t can be worked up in a definitely limited numbe clear-face cuttings, each passing a minimum size quirement. From the stick the number of cutti permissible for different grades, lengths, and widths be read directly for all kinds of hardwood lumber exc black walnut, poplar, hickory, butternut, rock e and mahogany. Although it can not take the plac the technical provisions and full text of the Natio Hardwood Lumber Association rules and is not su cient in itself to grade lumber for shipping, it promi to be useful to nonprofessional inspectors and p chasers as well as to operators of small mills.

Crews Collect Cones on the Monongahe

Organized crews were used by the Forest Service 1930 and 1931 to collect pine cones on the Monong hela Forest, W. Va. In 1931 the men picked an av age of 2.19 bushels each per day. With a wage sc of 40 cents per hour for cone pickers and 45 cents hour for crew leaders, the expense, exclusive of the c of transporting the men to and from the job, w $1.22 per bushel of seed collected.

Each member of the crews was supplied with a buck to which 40 feet of rope was attached, a sack, and safety belt. The crew leader emptied into the in vidual pickers' sacks the buckets full of cones th were lowered to him and measured and tallied t quantity of cones picked by each man. The sac were sewed for shipping and each was tagged to sh source, elevation, and collection date. When cre were working close to a road the ground man carri the filled sacks to the road where they could be pick up with a truck. From more isolated places ea picker carried in a load at the end of the day, leavi the remainder to be picked up later.

Norway Pine Reproduction Assisted B Disk Harrowing

The difference between 2,000 seedlings per acre an 15,000 seedlings per acre cost only about 75 cents in a experiment carried out by the Lake States Fore Experiment Station with Norway pine on the Chippew National Forest, Minn. The method used was diskin with an ordinary farm disk harrow to assist natur reproduction. The area selected for the trial was 3-acre plot in an old Norway pine stand practicall devoid of young tree growth. This was disked in th autumn of 1930 at the time of seed fall. A year later i was found that more than 15,000 one-year-old pin seedlings per acre were present on the disked area, while on the adjoining undisked area there were only 2,000 seedlings per acre.

In subsequent tests with known numbers of seed, a year after sowing there was 1 seedling for each 35 seed sown on disked soil and 1 seedling for every 50 seed sown on undisturbed soil. On the disked soil the rate of seedling mortality in the first season was about 20 per cent, while on the undisked soil it was about 50 per cent.

By cutting up the sod and shrubs in the ground the disk lessened the competition of the undergrowth. Seedlings were most numerous in the bottoms of the narrow furrows made by the disk. Evidently the furrows protected the seed from birds and rodents, as well as providing better conditions for germination and survival.

Additional Lands Designated as Experimental Forests and Primitive Areas

Five additional national-forest areas were recently designated by the Forester as experimental forests. The Mount Graham tract, a part of the Crook National Forest in Arizona, includes 3,040 acres of Douglas fir and Engelmann spruce lands that are for the most part typical of the best in the southwestern region. The Swayne Mountain Experimental Forest includes 6,080 acres of the Lassen National Forest, Calif., near Westwood. Here the California Forest Experiment Station will conduct research in methods of timber cutting and slash disposal on 3,000 acres of red and white fir timberland, and will undertake reforestation work on more than 1,000 acres of brush fields. Research and demonstrations will be conducted by the Lake States Forest Experiment Station on three new experimental areas in northern Minnesota which represent the various forest types and conditions found in that region. In the Chippewa National Forest, the Cutfoot tract of 1,335 acres is well stocked, largely with Norway and jack pines, and the Pike Bay experimental area of 1,422 acres contains forests of an aspen-hardwood type, including also a small area of virgin white and Norway pine. The Kawishiwi Experimental Forest, comprising 2,635 acres within the Superior National Forest, contains three important timber types—jack pine, black spruce, and aspen—which are distinct from those found elsewhere in the Lake States region and therefore require special study.

Several new "primitive areas," provided for by the same regulation under which experimental forests are designated, have recently been approved by the Forester. These lands, which will be preserved so far as possible in their present wild state, are all rugged mountain areas, over which travel must be on foot or horseback. Their timber is in most cases too inaccessible to be of commercial value, although it provides watershed protection and aids in regulating streamflow. Most of these areas contain high peaks, waterfalls, lakes, and glacial and rock formations of great scenic interest. Wild life is protected. Among the recently approved primitive areas are the following:

In California.—Devil Canyon-Bear Creek, Angeles National Forest, 36,200 acres; San Rafael, Santa Barbara National Forest, 74,990 acres.

In Colorado.—West Elk, Gunnison National Forest, 52,000 acres; Flat Tops, White River National Forest, 117,800 acres; Upper Rio Grande, Rio Grande National Forest, 56,600 acres; Uncompahgre, Uncompahgre National Forest, 68,253 acres; Mount Shavano, Cochetopa National Forest, 32,100 acres; Rawah, Roosevelt National Forest, 25,720 acres.

In Montana.—Absaroka, Absaroka National Forest, 64,000 acres; Spanish Peaks, Gallatin National Forest, 50,000 acres.

In Wyoming.—Cloud Peak, Bighorn National Forest, 94,000 acres; Stratified, Washakie National Forest, 147,000 acres; Glacier Peak, Washakie National Forest, 108,500 acres.

In New Mexico.—Gila, Gila National Forest, 695,296 acres.

Recreational Use of National Forests Grows

Recreational use of the national forests increased in 1931, the estimated total of visitors reaching 32,228,613, a gain of 324,098 over the preceding year. The total includes 496,566 special use permittees and guests, 1,618,460 hotel and resort guests, 2,193,866 campers, and 3,765,025 picnickers. Increased numbers of the latter class of visitors more than offset a decrease in the number of transient tourists from 24,993,591 in 1930 to 24,154,696 in 1931. Travelers to the forests by automobile numbered 29,836,412, a gain of 284,805 over 1930. Railroad and trolley passengers visiting the forests numbered 1,925,237, about the same as in the year before. Hikers increased more than 10 per cent, with 248,970 in 1931 against 220,853 in 1930.

The national forests in California had 17,454,748 visitors, a gain of more than half a million for the year; those in Arizona had 2,818,534 visitors; Colorado, 2,265,071; Oregon, 1,651,573; New Hampshire, 1,563,777; Washington, 1,407,354; Montana, 1,050,243; New Mexico, 1,033,933.

* * *

Bamboo rakes have been found very useful in giving the last preparatory touches to seed beds in the Savenac nursery. They remove small stones and débris that ordinary rakes will not touch. The two sizes tried out have a 20-inch and a 15-inch spread, respectively. They are generally procurable at any large hardware store.

General Forest News

Butt Rot in Balsam Fir on Gale River Forest

Butt-rot infection was present in 42 per cent of the merchantable balsam fir, destroying the value of 4.5 per cent of its volume, on areas of the Gale River Experimental Forest examined by Perley Spaulding and G. H. Hepting, of the Bureau of Plant Industry, and H. J. MacAloney, of the Bureau of Entomology. This experimental forest, which is a part of the White Mountain National Forest, N. H., includes about 1,300 acres in the vicinity of Bethlehem, N. H. The plots covered by the study of decays of balsam fir were established within the spruce flat type. On these plots balsam fir about 60 to 70 years old was found interspersed with red spruce. Evidently the stand had come in following early lumbering operations and a subsequent clean burn.

All balsam firs down to 1 inch in diameter at breast height were cut and examined for decay by methods developed and applied in western species by Meinecke, Weir, and Boyce, and in balsam fir in Canada by McCallum. Three decays were found to cause most of the cull: red heart, caused by *Stereum sanguinolentum* (Alb. and Schw.) Fries, occurring in the middle or upper trunk; brown butt rot, caused by *Polyporus balsameus* Pk.; and stringy butt rot, caused by *Poria subacida* Pk. Evidences were found, also, of injury by carpenter ants (*Camponotus herculeanus* Linn.).

The butt rots, through their weakening effect on the tree at the point of greatest strain, had been the direct cause of windthrow of as much as 20 per cent of the total stand of balsam fir on certain areas. Under average conditions, reduction from this cause was 7 per cent. Such reduction was especially marked in dense stands.

Of the total number of trees affected by butt rot 7 per cent had been attacked by both stringy butt rot and brown butt rot, or by ants in addition to one of these types of rot; 76 per cent had been attacked by stringy butt rot only, and 17 per cent by brown butt rot only. Sixty-four per cent of the total butt-rot cull was caused by stringy butt rot, 20 per cent by brown butt rot, and 16 per cent by the two combined or by one of them together with ants. Red heart had attacked 7 per cent of the trees. Carpenter ants had attacked 3 per cent of the trees, their activities alone causing a cull in merchantable volume of 0.3 per cent.

A direct relation was found between age of trees and percentage of trees defective. No decay was found in trees less than 40 years old. The following table shows the correlation of age with decay in the balsam fi examined:

Age class, in years	Number of trees	Number of trees with butt rot	Number of trees with red heart	Number of trees with ant injury	Total number of defective trees	Percen age of defecti trees
31–40	26	0	0	0	0	0
41–50	37	4	0	0	4	10
51–60	185	[1] 57	[1] 14	3	71	38
61–70	298	[1] 128	[1] 16	[1] 10	143	48
71–80	16	9	0	0	9	56
Total	562	198	30	13	227	--------

[1] Some overlapping is due to occurrence of both butt rot and red hea or ants in the same tree.

No decided difference was noted in susceptibility t decay between fast-growing and slow-growing tree

Pictures Made With Special Camera Sav Time in Spotting Fires

Panoramic photographs that make it a simpl matter to determine the location of forest fires ar produced with a camera designed by W. B. Osborn of the Portland, Oreg., office of the Forest Servic This camera has practically all the features of a surveyor's transit, including leveling head, full azimut circle and vernier, open sight alidade (which may b replaced by a telescopic alidade), high-grade magneti needle, 1-minute spirit level, and provision for a sola attachment. Among other things this enables th operator to obtain a true meridian and precise orientation from any set-up without recourse to other instruments. Each negative covers an arc of 126 degree Its upper and lower margins are automatically graduated in azimuths. At each end is a level line marke and a true vertical angle scale. As soon as the negative is developed a true level line is scratched acros its face and the name of the lookout or other statio from which the picture was taken is inked in on an en margin.

Given a picture of this character and a very simpl printed scale, one can read off the true azimuth an vertical angle to any object shown in the picture and vice versa, can spot the exact position of any objec reported from the station by azimuth and vertical angle.

In making use of such graduated photographs for forest-fire protection, the practice is to obtain a complete set of the pictures from each lookout station and supply each ranger, dispatcher, and fireman with pictures of the territory within his protective unit. A set of prints is supplied also to each supervisor's or other office that may have occasion to refer to them. When a lookout reports a fire by azimuth and vertical angle the ranger, the dispatcher, and the fireman need only a few seconds to spot the fire on their photographs. A pocket magnifying glass brings out a quantity of opographical detail by which to identify the fire's ocation and also much detail in regard to factors ffecting the rate of spread, such as steepness of slope, spect, and, in some cases, cover conditions.

American Forestry Association Meets in Baltimore

Conservation of the water resources of the Nation hrough control of erosion and protection of watersheds was stressed at the annual meeting of the American Forestry Association, held jointly with the Maryland Forestry Association in Baltimore, Md., May 26 and 27. Members of the two associations, foresters, and onservationists from nearly every section of the ountry heard Arthur M. Hyde, Secretary of Agriculure, discuss The Cost and Cure of Erosion. Other peakers at the various sessions of the meeting, which were presided over respectively by George D. Pratt, president of the American Forestry Association, R. Y. Stuart, Chief of the United States Forest Service, and . Harris Franklin, president of the Maryland Forestry Association, were: N. G. Grover, United States Geo-ogical Survey; Samuel S. Wyer, Fuel-Power-Transportation Educational Foundation; S. B. Show, United States Forest Service, who read a paper by George P. Clements of the Los Angeles Chamber of Commerce; Malcolm Pirnie, American Society of Engineers; Reed W. Bailey, Utah State Agricultural College; E. I. Kotok, United States Forest Service; W. S. Conant, American Engineering Council; Henry O'Malley, Chief of the Bureau of Fisheries; Mrs. John F. Sippel, president of the Federation of Women's Clubs; and Paul G. Redington, Chief of the Biological Survey. Speakers at the banquet on May 26 were Raymond A. Pearson, president of the University of Maryland; Philip W. Ayres, Society for Protection of New Hampshire Forests; and William . Bulow, United States Senator from North Dakota.

Among several resolutions adopted by the conference was one urging that any national program for unemployment relief appropriations should include plans for the improvement, development, and protection of public forest lands.

During a field trip on May 27, which concluded the meeting, a scion of the Washington elm at Cambridge, Mass., was dedicated in Druid Hill Park by the Daughters of the American Revolution; a walnut tree grown from seed gathered at Mount Vernon was planted by Boy Scouts on the grounds of the new campus of Goucher College, near Baltimore; and visits were made to Patapsco State Forest and Lock Raven State Park.

Water Utilization Studied in Western States

Studies bearing on the effective utilization of water in agriculture are being conducted by the Bureau of Agricultural Engineering with the cooperation of most of the Western States. These "duty-of-water" studies involve investigations as to the quantities of water required for the most economical production of crops, the prevention of waste in applying water to crops, and net irrigation requirements of lands under various physical, climatic, and agricultural conditions.

Studies in southern California have to do with the use of water by both cultivated and wild plants, evaporation from soil and water surfaces, and rainfall penetration into the valley floor. In cooperation with the Bureau of Plant Industry and the Forest Service, studies have been begun to determine the water requirements of tree and shrub growth in canyon bottoms or stream beds. Results so far indicate that the quantities of water economically lost through use by the vegetation on a given area of river bottom in two summer months may equal the annual irrigation requirement of an orange grove of equal area. In many parts of southern California, one region of central California, and certain small areas in Arizona, Colorado, and Utah some work has been done toward conserving surface run-off by spreading it so that it will percolate to the underground water table and be stored there, available for pumping back to the surface when required. Experimental and check plots at the mouth of San Gabriel Canyon in Los Angeles County, Calif., are to be used to obtain data on methods of applying water to percolation areas and particularly on the relative rates of percolation into the ground when the ground has been left in its natural condition, when it has been cleared of vegetation, and when it has been plowed, respectively.

Olson Advises Buying Cones by Weight

"Sackful" is a very inexact expression as applied to quantities of pine cones, and "a bushel of cones" tells little in terms of seed yield, says D. S. Olson, who advocates that nurserymen buy their pine cones by weight. Measuring western white pine cones offered for purchase at the Savenac nursery, Haugan, Mont., Mr. Olson found that gunny sacks supposedly of standard size contained as little as 1.5 bushels and as much as 2.3 bushels of cones apiece, according to the actual size of the sack and according to whether the sack was closed by sewing or by tying. When he weighed sackfuls of cones he found even greater differences, governed largely by the degree to which the cones had expanded as a result of drying. Sackfuls varied from 315 tight cones weighing 56.62 pounds to 60 dried cones weighing 6.65 pounds.

West Coast Lumbermen's Association to Carry On

In spite of a recommendation by the trustees that the organization be abandoned because of the decreasing membership and nonpayment of dues, stockholders of the West Coast Lumbermen's Association at a meeting in Tacoma, Wash., on May 31 decided to continue minimum essential activities at least until September 1, 1932. In the meantime the association will endeavor to secure the support of mills representing 80 per cent of the production of the lumber industry in the Northwest. Drastic reductions in dues were made, the rate per thousand board feet on shipments of logs and lumber being decreased from 10 cents to 3 cents for combined mill and logging units, and from 5 cents to 1½ cents for individual lumber manufacturers and independent loggers. These low dues, W. B. Greeley, secretary-manager of the association, believes, will aid in attaining the necessary increase in membership. The activities which will be maintained include mill inspection, supervision of members' grades, issuance of certificates, grade marking, traffic work, and statistics.

Ants and Rodents Aid in Control of Mountain Pine Beetle

By H. J. Rust, United States Bureau of Entomology

Success of the bark-peeling method of controlling attacks of the mountain pine beetle is assured where ants, centipedes, and small rodents are present, but where the immature insects are protected from these predacious enemies they may develop and attack the trees. These conclusions were reached as the result of extensive experiments conducted after the discovery in 1927 that a certain percentage of exposed, immature barkbeetles of this species could mature in the duff. The peeling method of control, based on the assumption that the removal of the bark from infested trees while the barkbeetle broods were in the larval or pupal stage between the bark and the wood would result in their death through exposure and lack of food, had been in use since 1905. Studies were made to test the effectiveness of the method as practiced against outbreaks of the mountain pine beetle in lodgepole and white pines.

In making the tests to determine the degree of survival of mountain pine beetle broods in different stages of development when exposed in the duff but protected from predacious enemies, undeveloped broods were placed in wire-screen cages constructed around the base of green, standing trees. When thus protected, prepupal larvæ, pupæ, and new adults of the beetle matured and successfully attacked healthy trees.

To determine the survival of unprotected insect broods, observations were made on a large number of plots established at or near recently treated logs which insects were placed. In open stands of lodgepo pine on the Bitterroot National Forest, Mont., an and centipedes destroyed the exposed broods in a ve few days, the ants being active on the south, east, a west exposures, and the centipedes on the mossy nort slopes. In the denser white pine stands of the Coe d'Alene, Clearwater, and Kaniksu National Forests i Idaho and Washington, small rodents, such as mic shrews, voles, and chipmunks, in addition to the a population, were instrumental in destroying the expose broods. Practically all of the newly formed adul were destroyed, but the mature adults escaped b flight or by boring into pieces of bark lying on t ground.

A number of rodents were captured on the plots an placed in captivity. These captives were fed dail with varying numbers of mountain pine beetle larva pupæ, and new adults. A chipmunk consumed 25 insects daily; a white-footed mouse, 559; a shre 500; a vole, 345; and a female white-footed mouse wit five young, 1,277.

It may be safely assumed that in all white pin stands sufficient numbers of these enemies of th mountain pine beetle are present to make the peelin method of control successful, particularly during th larval and pupal stages of the insect.

Americans Advised to Test Pinus Peuc

Foresters in all the white pine regions of the Unite States should make experimental plantings of Macedonian pine (*Pinus peuce*), in the belief of S. B. Detwiler, Chief of the Blister Rust Control Division, Burea of Plant Industry. Observations on its growth i Europe indicate that this pine may have value in th United States as a partial substitute for the nativ white pines because of its apparent immunity to th white pine blister rust. Some planting stock of th species will soon be available from seed sown by th bureau in 1929 and 1931, and additional test planting are to be made with seed supplied by Karl M. Mülle of Munich, Bavaria.

Doctor Müller, who was engaged by the Bavaria State forest administration in 1926 to make a study o Macedonian pine within its natural range in the Balkans and report observations bearing on its cultivation states that the climate in which the tree occurs naturally is very similar, in general, to that of the wester United States. The pure, even-aged *Pinus peuce* typ ranges in the Rila Mountains between 5,600 and 7,30 feet elevation, and in mixure the tree occurs at elevations down to 4,000 feet. At high elevations the bes growth occurs on steep, cool, shady slopes, owing t a need of protection against direct sunlight. In it natural range the pine grows almost exclusively o silicate rocks, but it is cultivated successfully on othe mineral soil.

Although not very deep rooted, Macedonian pine is ery seldom wind thrown. The elasticity of the wood s such that snow damage does not occur. In tolernce of shade Macedonian pine is about equal to orthern white pine. In the Balkans it can be conidered moderately fast growing. Examination of umerous sample trees showed that height reached 40 nches in an average of 11.5 years, 60 inches in 14 years, nd 80 inches in 16.3 years. For trees cultivated at ower levels the growth in height lags very little, if at ll, behind that of northern white pine.

In its native range Macedonian pine is classed by oresters as the conifer least affected by insects and ungous diseases. It is a first-class timber species, not nferior in height growth to Scotch pine (*Pinus sylvesris*) or white fir (*Abies pectinata*). Usually at an age f 200 years and at elevations up to 6,600 feet it ranges rom 90 to 120 feet in height and from 16 to 24 inches n diameter at breast height. The wood is heavier han spruce (*Picea excelsa*) and white fir and only a ttle lighter than Scotch pine. In durability it exceeds hite fir and spruce and nearly equals Scotch pine.

The tree begins to bear seed at the age of 17 to 20 ears on shady, cool slopes, and at 12 years in hot, dry ocalities. Heavy cone crops occur every three or four ears. A strong turpentine taste repels browsing nimals.

At Grafrath, near Munich, Macedonian pines planted bout 23 years ago by Heinrich Mayr have reached verage heights of 20 to 25 feet and average breast-eight diameters between 3.6 and 5.6 inches, with aximum height about 27 to 30 feet and maximum iameter between 4.4 and 6.6 inches. "There is no oubt," writes Doctor Müller, "that this young stand f Macedonian pine at 1,600 feet elevation is growing etter than the original second growth at 6,000 feet levation and more than 6° farther north. There is ot very much difference between *Pinus peuce* and *inus strobus* in the same locality and under equal onditions."

A characteristic that complicates the growing of *inus peuce* in the nursery is very slow germination. he seed are heavy—100 seed weigh 3.95 grams—and ermination is delayed for one or two years. Experients have not been made to determine whether gerination can be hastened by storing the seed at very w temperatures.

Mr. Detwiler comments on Doctor Müller's suggesons as follows:

> Our nothern white, western white, and sugar pines re the cream of the United States forest species, and is more reasonable and practicable to apply local ontrol to protect these splendid native stands than to lant an exotic species in their places, especially since n most sites the cost of such protection is less than hat of planting.
>
> Five-leafed pines now form natural stands over illions of acres. Even if only the very best of the resent 5-leafed pine sites in the United States are considered, a total of more than 20,000,000 acres is involved. Forestry is not yet sufficiently developed in America to permit us to consider replacement of the white pines through planting on the tremendous scale which would be required. This is shown by our experience with the forests destroyed by chestnut blight; practically no attempt has been made to replace them through planting. We believe that foresters in all the white pine regions should make experimental plantings of *P. peuce*, to ascertain the growth and yield of this species under the various conditions of climate and soil and test its freedom from rust. It will take an entire forest rotation to answer these questions, but if Macedonian pine succeeds well during the early years of trial we should be justified in advocating large-scale experimental planting.
>
> World-wide history of attempts to use exotic forest species to replace native species shows that the odds against exotics are great. Obviously, we can regard the Macedonian pine only as a hopeful possibility. In Germany the commercial white pine species are all exotic, and under these conditions there is little difficulty in substituting *P. peuce* for *P. strobus*. With our millions of acres of natural 5-leafed pine forests, our situation is entirely different from Germany's. However, forest planting in the United States is gradually increasing, and no time should be lost in determining the value of Macedonian pine for such use.

Sunspots and Forest Fires

"Sunspot indications justify extra precautions to safeguard forests against fire," declares Ralph E. DeLury of the Dominion Observatory, Ottawa, in the Canadian monthly, Forest and Outdoors. Canadian records show that forest fires have been abnormally frequent and devastating during sunspot minimum years. That the next sunspot minimum, due in the latter part of 1934 according to the 11.2-year average cycle, will arrive earlier seems to be indicated by the fact that sunspots have already become very scarce in the past few months. It is probable, therefore, that the next three or four years will bring increasing summer temperatures and lightning storms, both conditions tending to increase the forest-fire hazard.

Records at Toronto of temperatures and number of thunderstorms from 1873 to 1925, when compared with the sunspot cycles for the same period, show an average temperature 1.4° F. higher, with 33 per cent more thunderstorms, at sunspot minimum than at sunspot maximum periods. Stations in Alberta show temperatures 3° to 4° higher at sunspot minimum. Mr. DeLury explains:

> At sunspot maximum nearly double the amount of ultra-violet light reaches the earth than at sunspot minimum. Ultra-violet light ionizes the terrestrial atmosphere, promoting the formation of gaseous compounds and inducing greater haziness and cloudiness at sunspot maximum. Therefore at sunspot minimum more solar radiation reaches the surface of the earth, stimulating convection, evaporation, and electrical storms, thus tending to increase the fire hazard.

In the case of precipitation, the response to the sunspot cycle is more varied. Oceanic regions, as represented by St. John's, Newfoundland, have greater precipitation at sunspot maximum, when temperatures are lower; in inland regions, as represented by Montreal, there is greater precipitation at sunspot minimum when temperatures are higher. The same distinction is shown in the yearly trend of precipitation, which is greater at the ocean in the cold months and greater for inland regions in the hot months. Intermediate regions share in the oceanic and inland reactions, exhibiting two pulses in the sunspot cycle, or in other words a half sunspot cycle. The increased rainfall in the interior of Canada at sunspot minimum compensates somewhat for the higher fire hazard resulting from increased temperatures, evaporation, and lightning during that period.

Protecting Turpentined Timber From Insect and Fungus Injury

Prevention of insect and fungus damage to turpe tined timber through dry or burned faces has been t object of experiments by Haynes Huggins, woods supe intendent of a southern Alabama lumber compar Mr. Huggins believes that wood which is sealed ov by a coating of gum is safe from attack by insects fungi. It is known that the turpentine beetle, f example, will not attack fresh faces, concentrating work on exposed wood. Three or four new streaks the face will usually result in a sufficient flow of res to provide effective protection until the tree cut.

Foreign Notes

Redwood Growth in Southwestern France

A group of redwood trees planted in France in 1856, reputedly at the suggestion of Empress Eugénie, at a spot bordered by the road from Laruns to Eaux-Bonnes, is pointed out as demonstrating the adaptability of the species to conditions existing in western and southwestern France. Of the 14 trees remaining after a large number were felled in connection with the widening of the road, the largest were reported in 1931 by Assistant Inspector Sannac of the administration of forests and waters to have attained the following dimensions: 1 tree, 3.75 meters in circumference (at a height of 1.3 meters) and 19 meters in height; 3 trees, 3.5 meters in circumference and 21 meters in height; 1 tree, 3.45 meters in circumference and 18 meters in height; 1 tree, 3.15 meters in circumference and 17 meters in height; and 1 tree, 3.15 meters in circumference and 15 meters in height.

Forestry Courses for Norwegian Army Recruits

A forestry course for army recruits was instituted in Norway this spring when 100 men and 7 noncommissioned officers under the direction of Capt. J. Dugstad, who had studied this type of work as conducted by the French Army, began 48 days of work in theoretical and practical forestry combined with military training. The Norsk Skogselskap (Norwegian Forest Co.) of Oslo, a semiofficial organization maintained partly by private contributions and partly by funds raised through Government lotteries, financed the undertaking except for the equipment and clothes of the recruits, which were to be furnished by the Norwegian Army.

Most of the young men enrolled in the course we from western Norway where forests are not so comm as in the eastern sections of the country, and it was t hope that upon returning to their homes they wou put into practice what they had learned of forestr It was planned to have them plant 150,000 trees duri the course.

If this experiment turns out to be a success, a larg number of the 4,000 recruits who undergo special trai ing for a few weeks each year under army supervisi will probably be assigned to the forestry course.

Swiss Forester Discusses Interrelatio Between Forests and Rainfall

Do forests increase atmospheric precipitation, or a they the result rather than the cause of abundant rai fall? M. Moreillon writing in the Journal Foresti Suisse[2], gives data on both sides of this much-discuss question, and reaches conclusions which he designat as "a contribution to research on the relation whi may exist between rainfall and the density of fore cover of a region."

Records are not lacking that can be interpreted proof of the theory that the existence of forests i creases the amount of rainfall. The Forest School Nancy, France, established rain gages in three plac near that city in 1867 and kept records of the amount rainfall for 33 years. The greatest amount of rain fe at the first station, which was situated in the midst a forest; at the second station, several hundred mete from the border of the forest, the rainfall was 93.7 p ent as much; at the third, which was in cleared agriultural land, it was only 76.7 per cent of that at the orest station.

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[2] Moreillon, M.: Pluviosité et Taux de Boisement du Plateau Suiss Journal Forestier Suisse, January, 1932, pp. 13-19.

Other records, however, have shown that in entirely imilar stations in the same locality noticeable differnces in amount of rainfall may occur for no accountble reason. Theories as to the cause of augmented ainfall where there are forests are that friction diminshes the velocity of air currents as they pass over a orest and causes an ascending movement which favors ondensation of atmospheric vapor; and that warm, amp air is subjected to a cooling influence when passng over forests, which causes precipitation. There are nany other theories of the causal relationship between orest cover and rainfall. But, in Switzerland at least, o which this study is confined, precipitation must lepend to some extent on altitude, since there is abunlant rainfall above the timber line, where the presence f forests on the lower slopes has no influence.

The data on which M. Moreillon's conclusions are ased were obtained from observations recorded at 28 tations in the Swiss Plateau region, at altitudes beween 400 and 900 meters, during the years 1901–1920. Complete records were kept over this period of the mount of precipitation, number of days with more han 1 mm of rainfall, average precipitation per day, nd density of forest cover at each point; these factors vere studied to ascertain whether there was any contant interrelation between them. The conclusions re:

1. Rainfall increases with altitude and not with egree of forest cover.
2. Density of forest cover depends on several factors, f which the most important are climate, physiography, eology, and economic conditions.

Finland's Older Forest Industries

As Finland's great forest industry the present-day roduction of paper and wood pulp was preceded three enturies ago by the production of tar. The tar was urned from young pine trees. E. E. Kaila writes of his old-time industry as follows:

> When the power of the Hansa had been broken early n the sixteenth century and trade was started between Finland and Holland, England, and other countries, uch products began to be exported directly from Finland or else via Sweden—to which Finland was nited up to 1809—as were required in the countries urrounding the North Sea on account of their large nd constantly growing shipping and as could easily nd cheaply be prepared in Finland: Tar and wood oods, planks for shipbuilding, etc. There were lmost unlimited quantities of these in the Finnish orests. Formerly the forests of Finland had been sed almost exclusively for crop burning, by means of which the country obtained its grain.
>
> Tar in particular became a very important article of xport from Finland, as it was not prepared in the rest f the world nearly so cheaply, nor in such quantities, s in Finland. In the days of the greatness of wooden hips Finnish tar shone on the sides of the mighty rigates of Drake, Van Tromp, Ruyter, and Nelson. In the trade of Finland in 1640, for instance, half of the exports consisted of tar. At that time tar was burned to some extent here and there in the forests growing in other countries, Norway, Poland, Archangel in Russia, and Virginia, and a little in north Sweden, but only on a fairly small scale compared with Finland.
>
> The three principal methods of utilizing the forests of Finland were not the same throughout the country, because of the weight of the products. The cheap products would not stand long transport by land. Until the time of railway construction Finland was handicapped by difficulties of transportation and accordingly the country was divided from the interior to the coast into three main zones of production as regards forest products. The cheapest products, such as wood goods (boards, planks, wood, etc.), were confined on account of their weight to the coastal district. This zone was about 20 to 30 kilometers wide. Beyond it the zone of tar burning began; the tar was, in relation to its weight, considerably of higher value than wood goods. But as transportation from the interior parts of south Finland had to proceed over hilly ground, the tar was not usually transported to the coast from the interior of south Finland, nor was it prepared there except in some cases for household requirements.
>
> Before 1721 tar was burned on a large scale in east Finland, Savo, and Karjala, as the route across the lakes was very cheap for transporting tar barrels by water to the vicinity of the port of Viipuri. But when Viipuri and its surrounding district became part of the Russian Empire, the transport of tar by boat from Savo and Karjala ceased and tar burning in the whole of east Finland also came to an end.
>
> The zone of crop burning was furthest from the coast; its product, grain, which was the most valuable in relation to weight of the products prepared in Finland, used to be transported by horses, especially during the period of snowroads, from the interior to the towns on the coast for sale across the whole of Finland. Crop burnings were, of course, made partly in order to obtain home-grown bread in the districts of the tar-burning zone.
>
> With the development of economic life and traffic the crop burnings fell off in Finland in the middle of the nineteenth century; the trees, the forests grew in value, then tar burning fell off and the building of wooden ships also. A different method of preparing wood goods for the sawmill industry was started by making use of the rapids to a greater extent, and lately the paper and wood-pulp industry has taken its place in Finnish production and national economy as a fourth method of exploiting the forests.

* * *

No protection from Government sources will be available to privately owned or leased timberlands in British Columbia for the fiscal year April 1, 1932, to March 31, 1933. The "Forest Protection Fund," made up of contributions from the Government and the private timber holders, has been suspended for that period by the Provincial Government.

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Gales in Europe were so severe last winter than Sweden alone is said to have had 3,000,000 forest trees wind thrown.

Personals

James W. Toumey, professor of silviculture at Yale University, died suddenly on May 6, 1932, at New Haven. For 32 years Professor Toumey was associated with the Yale School of Forestry, holding positions ranging from assistant professor of forestry to dean of the school. A graduate of Michigan State College in 1889, Professor Toumey spent two years there as assistant in the department of botany, then for eight years was at the University of Arizona, advancing there from assistant professor of biology to professor of botany and director of the Arizona Agricultural Experiment Station. He was in the United States Forest Service from 1899 to 1900, when he was called to Yale. His approach to forestry being from the botanical side, his chief interests were in dendrology and silviculture. Since 1922, when he retired as dean of the Yale Forest School, he devoted his time chiefly to research, the development of graduate study, and building up the Yale Forest at Keene, N. H. A personal herbarium of 2,500 specimens of American trees and shrubs was presented by him to Yale. He held the honorary degrees of doctor of science from Syracuse University and doctor of forestry from Michigan State College. He was the author of a number of scientific bulletins and of two widely used forestry textbooks, Seeding and Planting in the Practice of Forestry, published in 1916 and revised in 1931 with C. F. Korstian as co-author, and Foundations of Silviculture, which appeared in 1929. One of the leaders in forestry from its early days, Professor Toumey has had a profound and lasting influence on the profession.

Senator W. F. George of Georgia has been appointed a member of the National Forest Reservation Commission to fill the vacancy created by the death of Senator W. J. Harris.

Officers elected for the coming year at the May meeting of the Washington section of the Society of American Foresters are J. P. Kinney, director of forestry of the Indian Service, United States Department of the Interior, chairman; A. E. Fivas, of the Office of Blister Rust Control, Bureau of Plant Industry, United States Department of Agriculture, vice chairman; Perkins Coville, of the United States Forest Service, secretary.

W. M. Beveridge, junior forester on the Lincoln National Forest, N. Mex., has been transferred to the Southwestern Forest and Range Experiment Station at Tucson, Ariz. Mr. Beveridge will be assigned to range management investigations in the ponderosa pine type of the Coconino Plateau.

Samuel J. Record, professor of forest products Yale University, has been elected secretary-treasu of the International Association of Wood Anatomis The purpose of this association, which was organiz in Paris last July in conformity with resolutions adopt by wood anatomists attending the Fifth Internatio Botanical Congress at Cambridge, England, in 19 is to cooperate in a systematic investigation of t woods of the entire world through the pooling materials, standardization of terminology and descri tions, and the exploration of little-known forest regio Fifty scientists in eighteen different countries compri the present membership. Eleven members of eig nationalities form the executive council, on which a two Americans—Professor Record and Irving Bailey, professor at Harvard University.

Herbert Dreher, of Owosso, Mich., has recently be elected executive secretary of the Michigan Forest Association. Mr. Dreher is also chairman of the forestation committee of the Owosso Chamber of Co merce. Other officers elected by the association a J. C. DeCamp, director of forestry and conservation the Hiawatha Sportsman's Club, Lansing, Mic president; George M. Ames, Grand Rapids, vice pres dent; and Robert Craig, jr., of the department forestry, University of Michigan, Ann Arbor, treasure

Percy M. Barr, assistant forester in charge of t research division of the department of lands in Briti Columbia, has returned to Victoria after spending semester at the University of California teaching fore mensuration.

A. B. Hatch has resigned his position as assista silviculturist at the Allegheny Forest Experime Station to accept a scholarship at Harvard Universit Mr. Hatch will continue his studies on mycorrhizæ Harvard, doing most of the work under a cooperati arrangement with the Boyce Thompson Institute Yonkers, N. Y.

W. A. Robertson, conservator of forests in Rangoo India, from 1924 to 1931, has been appointed editor the Empire Forestry Journal, published semiannuall in London, upon the resignation of Fraser Story, wh has filled the position for the past nine years.

Ralph H. Johnson, planting assistant on the Huro National Forest, Mich., has been transferred to th Chippewa National Forest in Minnesota, where he wi take charge of the nursery, planting, and seed-extrac tion operations.

Charles H. Herty, inventor of the Herty cup and well iown for other work in connection with naval stores, is been awarded a medal by the American Institute Chemists for "noteworthy and outstanding service the science and profession of chemistry in America." octor Herty is now working on the problem of suc-ssfully producing paper pulp from slash pine.

W. C. McCormick, membership director of the merican Forestry Association, has accepted the posi-on of secretary of the Florida Forestry Association. Ir. McCormick plans to conduct educational work in lorida along the lines of the southern forestry educa-onal project of the American Forestry Association, which he was regional director during its 3-year mpaign ended in 1931.

Henry E. Clepper has recently been transferred from ie Pennsylvania Forest Research Institute to the ureau of Forest Research and Information of the ennsylvania Department of Forests and Waters at arrisburg, Pa.

H. L. Henderson, assistant professor of forest utiliza-on at the New York State College of Forestry, will ake a study of wood-using industries during a period sabbatic leave. He will also visit national forests, rest schools, and logging operations in New England id the South. Professor Henderson is preparing a xtbook on Air Seasoning and Air Drying.

R. S. Campbell and C. J. Whitfield, of the South-estern Forest and Range Experiment Station, each ceived the degree of doctor of philosophy from the niversity of Chicago June 14.

Laurie D. Cox, recently appointed head of the department of forest recreation and park engineering at New York State College of Forestry from the position of professor of landscape engineering at the same college, has been awarded the degree of doctor of science by Acadia University, Nova Scotia, from which he received his A. B. degree in 1903. Professor Cox was also graduated from the professional school of landscape architecture at Harvard University in 1908.

Officers elected by the Botanical Society of New Orleans for the year 1932–33 are L. J. Pessin, of the Southern Forest Experiment Station, president; Anna Haas, of Newcomb College, vice president; Philip C. Wakeley, Southern Forest Experiment Station, secretary; and Paul V. Siggers, Bureau of Plant Industry, treasurer.

Thomas M. Talbott, fire law enforcement officer, has been transferred from the Region 6 office of the Forest Service at Portland, Oreg., to the California region, where he will have charge of enforcement work in the northern part of the State, with headquarters at Yreka, Calif.

Louis E. Wise, who recently resigned as head of the department of forest chemistry at the New York State College of Forestry, Syracuse University, on account of illness, has been appointed professor emeritus of forest chemistry. Clarence E. Libby, for 12 years professor of pulp and paper manufacture at the college, succeeds Doctor Wise, with the title of head of the department of pulp and paper manufacture. Floyd E. Peterson, instructor in pulp and paper manufacture, has been promoted to the position of assistant professor of forest chemistry.

Bibliography

he World's Softwood Lumber Situation

By W. N. Sparhawk, United States Forest Service

On the basis of recent world production and trade softwood lumber, Professor Streyffert, of the College Forestry, Stockholm,[3] concludes that the prospect a continued steady increase in the world's demand r sawn lumber is less obvious than it used to be. omewhat optimistically he asserts that the adoption rational forestry methods has already largely in-eased the available supply of timber, and that it ay never be necessary to exploit the more remote forests of the world. For these reasons he does not anticipate that softwood lumber prices will ever rise substantially above the general level of commodity prices.

So far as the present depression is concerned, the author observes that lumber has shown a greater degree of adaptability to the diminished demand than perhaps any other staple article. Since the beginning of 1929 unsold lumber stocks in Sweden and Finland have declined approximately 32 per cent, in spite of a heavy decrease in exports. It is a little surprising to read that the tendency to maintain production at a sacrifice of profits or at a loss is less strong in the sawmill industry than in other staple industries, and that the reluctance of forest owners to sell their timber at low prices has directly contributed to the recent decline in production.

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[3] Streyffert, Thorsten: The World's Staples. XI. Sawn Woodgoods. dex (Svenska Handelsbanken, Stockholm), vol. 7, no. 75, pp. 62-85. 32.

International trade in softwood lumber amounted to 12,500,000,000 board feet in 1913, increased to 15,000,000,000 feet a year in 1927–1929, and declined to 10,000,000,000 feet in 1931. For four years (1926–1929) the exports from Europe as a whole were slightly more than the imports; before 1926 and since 1929 Europe, including Russia, has imported more softwood than she has exported to other continents.

Although Russia was the only country to increase her lumber exports substantially in 1930, there was no further increase in 1931 and a decline is in prospect for 1932. Professor Streyffert believes that Russian exports are more likely to decrease than to increase during the next few years.

American Arboretums and Botanical Gardens

By W. A. Dayton, United States Forest Service

There has recently been published by the American Association of Nurserymen (Inc.) a 25-page Report of the Committee on Botanical Gardens and Arboretums. This committee stresses the need of arboretums and botanical gardens and states that, for nurserymen, such institutions represent a necessary and authentic "museum, library, and laboratory," occupying a place in the horticultural world somewhat analogous to that of the Bureau of Standards in the mechanical and industrial arts. The pamphlet gives a list of 85 arboretums and botanical gardens, by States, indicating their names, locations, and directors' names; also a supplement, giving a synopsis of the work being conducted at each of 42 of these institutions. It is an invaluable reference work.

Slash Disposal and Forest Fire-Weather

By Paul W. Stickel, United States Forest Service

Settlers' slash, or "flat abatis," which creates a serious forest-fire hazard in colonization districts in the Province of Quebec, is discussed in relation to disposal methods under various meteorological conditions by L. H. Nichols in the fourth of a series of reports to the Quebec Forest Industries Association (Ltd.).[4] Among the settlers in Quebec it is the custom after utilizing all the merchantable timber on their land to cut down the remaining trees and bushes and leave the tangled mass on the ground to dry out for several months. Where such slash-covered areas, which are often of 20 acres or more, are contiguous to the green timberlands of pulp and lumber companies they are viewed with concern by limit holders. The abatis burns rapidly when ignited, consuming all the inflammable materials on the area, and, although observations show that fire seldom spreads into green timber to any c siderable depth, under certain conditions such sl burnings have been the cause of many serious p conflagrations.

In order to determine under what weather and fu moisture conditions the removal of slash incident the clearing of land for agricultural purposes can carried on without danger to adjacent timber, Nich investigated the inflammability of the forests cc tiguous to large areas of flat abatis which were burn at various degrees of dryness and under differe meteorological conditions. The field work was cc ducted on the south shore of the lower St. Lawrence the mixed spruce-hardwood forest type. In additi to match inflammability tests made on the duff pri to igniting the slash, measurements were made relative humidity, wind velocity, and moisture conte of the top three-fourths inch of the duff layer. The data, supplemented with similar information from fore fire-weather stations maintained from 1928 to 193 inclusive, form the basis of Nichols' conclusions ai recommendations.

Conditions were favorable to the indefinite spread combustion in the duff layer of green timber at on 13 fires observed. Considerable differences in weath and fuel-moisture conditions were noted at these fire The duff moisture content varied from 11 to 100 p cent; relative humidity from 28 to 54 per cent; ar wind velocity from calm to 20 miles per hour. Despi these wide differences, Nichols found the data suf ciently significant for the construction of a fire-hazar graph. Wind velocity is the controlling factor; tl variations in relative humidity and duff moistu content which will allow slash fires to spread in green timber are shown for three wind velocities, thu

Wind (miles per hour)	Relative humidity (per cent)	Duff moisture content (per cen
0	54 or less	56 or less.
10	58 or less	67 or less.
20	60 or less	105 or less.

Based upon the author's experience and the fac presented above, it is recommended that abatis fire be set only under the following conditions: Wind ve locity less than 10 miles per hour, relative humidit not lower than 40 per cent and likely to increase (a in the late afternoon or prior to showers), and du moisture content more than 70 per cent. When th duff contains as low as 40 per cent moisture, fires ma be set provided wind does not exceed 10 miles per hou and relative humidity is more than 60 per cent.

Nichols' report is an important contribution to fores fire-weather literature for two reasons. It brings t the fore the part played by wind in affecting the abilit of fire to spread. Save for Show's earlier conclusion this point,[5] no other data have been available up the present. Furthermore, the results obtained from e abatis-burning investigation are a practical test of e principles discovered at fire-weather stations. The formation obtained from these two methods of fire search are so nearly alike that Nichols believes just useful results can be obtained from small-scale ex-rimental burnings using different fire brands at fire-eather stations as from the more expensive, arduous, d even dangerous experiments with slash fires.

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[4] Nichols, L. H.: The Burning of Settlers' Slash and Meteorological Conditions in the Province of Quebec During 1931. 38 pp., including 5 plates and 15 tables. Quebec Forest Industries Association (Ltd.), 1931. Mimeographed.

ternational Address Book of Botanists

By W. A. Dayton, United States Forest Service

An international address book of botanists, prepared accordance with a resolution passed at the Fifth ternational Botanical Congress at Cambridge, ngland, 1930, has now issued from press, and can be btained from the publishers, Messrs. Baillière, Tindall, d Cox, 7 and 8 Henrietta Street, Covent Garden, ndon, WC 2, England, for 17 s., 1 d. ($3.25). The ok lists the botanical institutions of the world, and mes about 10,500 botanists.

The polyglot character of the congress itself is par-ally reflected in the trilingual (English, French, and erman) preface, index of countries, and country eadings in the main body of the book. The bulk of e book is taken up with the alphabetical list, under untries also alphabetically arranged, of botanical stitutions and botanists. The names of the botanists e given in boldface, followed by the degree or degrees, ficial position and address, and (in parentheses) most tive botanical interests. The States in the United ates are not separated, but Alaska, the Hawaiian lands, and the Philippines are treated individually. uerto Rico is included in the West Indies and Guam the Marianne Islands. A 4-column, 37-page index names concludes the work.

The book contains 605 pages. It is neatly bound in d linen.

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"A Manual on the Commercial Timbers of British dia," by R. S. Pearson and H. P. Brown, in two lumes containing 1,132 pages of text and 640 pages illustrations, is now in press as the result of the ecision of the government of India to bring all avail-ble information on this subject up to date. The anual deals with 320 tree species for each of which e given nomenclature and references, information distribution and supplies, a full description of the ructure of the timber, mechanical and seasoning operties, durability, working qualities, and present d prospective uses.

Denmark Publishes Forestry Bibliography

Denmark has published a comprehensive bibliography of its forestry literature from the beginning through 1925. The bibliography was compiled by A. Opperman, late director of the Danish Forest Experiment Station, and V. Grundtvig, chief librarian of the state library in Aarhus. Together with publications printed within the frontiers of the present Denmark it includes publications written by Danes but printed in other countries and publications of foreign authorship dealing with Denmark. The compilers endeavored to list, so far as possible, all works having a lasting scientific, administrative, or historical value. In cases of doubt they "followed a rule appropriate to a small country: include too much rather than too little." The titles listed number 4,718. Each Danish title is followed by a brief German annotation indicating the nature of the publication's contents.

The bibliography occupies 290 pages. An introduction explains, in Danish, German, English, and French, the purpose of the work and the plan on which the compilers proceeded.

By publishing this book in 1931 Denmark has won the honor of being the first nation to produce its volume of the Bibliographia Universalis Silviculturae that has for many years been a project of the body now known as the International Union of Forest Research Organizations. Originally suggested by Philipp Flury, of Switzerland, in 1903, the compilation of such a bibliography was agreed upon in 1906. A committee appointed at that time devoted considerable effort to collecting the older forestry literature with the intention to issue a general European forestry bibliography on a periodic basis. This work was interrupted by the World War and has but recently been taken up individually by nations represented in the International Union of Forest Research Organizations.

Recent Books and Pamphlets

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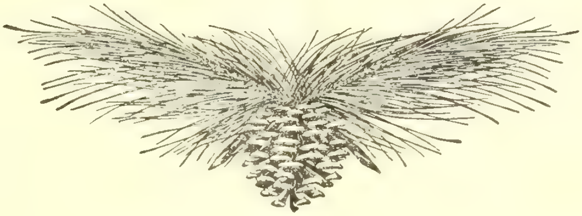
* * *

Structural characters of Canadian woods are d scribed and illustrated in a bulletin issued by the Fore Products Laboratories of Canada, "The Identificatio of Woods," Canadian Forest Service Bulletin 81. Th regions in which the trees grow, their principal use and keys for identification are given for all importa native trees of Canada, as well as for many others who products are common in Canadian markets.

U. S. GOVERNMENT PRINTING OFFICE: 193

FOREST WORKER



September, 1932

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UNITED STATES DEPARTMENT OF AGRICULTURE

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Announcements

Annual Meeting of Society of American Foresters

The Society of American Foresters will hold its thirty-second annual meeting in San Francisco, Calif., December 12–16, 1932. The first two days, December 12 and 13, will be devoted to meetings of the Council, while other members will have the opportunity of making trips into the redwood and Sierra regions. The general sessions, with papers and discussions, will be held December 14–15, with the following day, December 16, scheduled for Society affairs. Following the meeting in San Francisco, two days, December 17 and 18, will be spent in field trips in southern California out of Los Angeles.

Pack Fellowships for 1933-34 Available

Fellowships in forestry are again offered by the Charles Lathrop Pack Forest Education Board for the purpose of "encouraging men who have shown unusual intellectual and personal qualities to obtain training that will best equip them for responsible work, either in the general practice of forestry, in the forest industries, in the teaching of forestry, in forest research, or in the development of public forest policy." In awarding the fellowships no restrictions are made as to age, educational status, or practical experience, but ordinarily they will be granted only to American or Canadian citizens who have completed an undergraduate college course or its equivalent. Grants may be made for study at a school of forestry or an institute of resear on a forest under management, in association w forest industries, or in travel. Fellows will be pected to devote their full time to the work for wh the fellowships are awarded.

Applications for fellowships for 1933–34 must made to the secretary of the board, at 1214 Sixteer Street NW., Washington, D. C., by January 1, 19 The necessary application form and further inforn tion will be supplied by the secretary on request.

Data on Cone Crops of Southern Pin

Estimates of the 1932 cone crops of all species southern pines in terms of bushels of cones actual collectible, information as to expected logging oper tions this fall in bearing stands, and names of loc collectors have been compiled and mimeographed f distribution by an intersection committee of the Socie of American Foresters headed by Philip C. Wakele Copies may be obtained from Mr. Wakeley, whose a dress is the Southern Forest Experiment Station, 6 Stern Building, New Orleans, La. These data a being brought together each year for the purpose helping planters of southern pines to locate adequa and suitable supplies of seed as well as to establi records as a basis for study and analysis of se production.

The 1932 cone crop is in general light, but an abu dance of cones of each species is reported from a fe widely separated points.

The Forest Worker is published by the Forest Service, United States Department of Agriculture, Washington, D. C. Julia H. Drown, acting editor. Material offered for publication in the Forest Worker should be addressed to the editor.

Because the free edition is necessarily limited, this periodical can be distributed without charge outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

FOREST WORKER

Vashington, D. C. SEPTEMBER, 1932 Vol. 8, No. 5

State Forestry

Iississippi Law Provides for Forest Protection Tax

A law has been passed by the Mississippi Legislature
hich provides that county boards of supervisors may
ake special assessments for protection of timbered
d uncultivatable lands from fire upon receipt of a
tition signed by a majority of the freeholders of the
ea to be protected. The Attorney General of Missis-
ppi has declared the law constitutional. According
State Forester Fred B. Merrill, such a tax will enable
ndowners to obtain protection from woods fires at
out half the cost formerly paid. Instead of 4 cents
r acre per year for protection, a county payment of
cent per acre in north Mississippi or 2 cents in south
ississippi should be sufficient. A sum about equal
that raised in a county will be provided by the State
restry commission for protection work in that county.
he special annual tax shall not exceed 3 cents per acre.

The forest tax law of 1924, which provided a 10-year
emption on young growing timber, having been found
workable, was repealed by the legislature at the
quest of the State forestry commission.

The text of the new law is as follows:

SECTION 1. *Be it enacted by the Legislature of the State*
Mississippi, That for the purpose of receiving the
ancial and supervisory cooperation of the Mississippi
orestry Commission in forest protection, any board of
pervisors is empowered and authorized, in its discre-
on, to assess and levy a special annual tax not to
ceed three cents (3 cents) per acre against the tim-
red and uncultivatable acreage of the county, said
reage to be known as a forest protection area.

SEC. 2. And further, that for the purpose of receiving
e financial and supervisory cooperation of the
ississippi Forestry Commission in forest protection,
e board of supervisors is required to make and assess
ch an annual tax upon all said lands in the county,
any definitely described portion thereof, upon receipt
a petition so requesting, signed by a majority of the
eeholders of the county, or definitely described portion
ereof; said area to be known as a forest protection
ea.

SEC. 3. Said tax shall remain the same from year to
ar, except that it may be changed or discontinued
on receipt of a petition, so requesting, signed by a
ajority of the freeholders of the county, or definitely
scribed portion thereof, involved, or by the Mississippi
orestry Commission.

SEC. 4. That the tax so assessed shall be collected as other taxes are collected and remitted to a proper county depository or to the State Treasurer and placed in a special fund set up for the county, or definitely described portion thereof; said fund to be expended by the Mississippi Forestry Commission for forest fire protection in the county, or definitely described portion thereof, against which the tax has been assessed.

SEC. 5. That this act shall take effect and be in force from and after its passage.

Nursery Costs in Tennessee Reduced by New Seed Planter

A machine which plants forest-tree seed in even rows, covers them with earth to the depth desired, and rolls the bed, in one operation, has been perfected after several years of experiments by James O. Hazard, State forester of Tennessee. By the use of this new planter, expenditures for seed, planting, and seedling culture have been greatly reduced and the necessity of transplanting has been eliminated in the State nursery at Jackson, Tenn. As sown by this machine one pound of seed of such species as red pine, shortleaf pine, Norway spruce, and black locust has proved sufficient for a bed 100 feet long by 4 feet wide. A crew of four men, proceeding at a slow walk, can easily operate the planter, which distributes the seed evenly lengthwise of the bed in eight rows or bands approximately 2 inches wide and 6 inches apart from center to center. The amount of seed to be sown can be varied as desired. With this machine available a small crew is able to make up beds until late in the afternoon and then in a very short time plant all the prepared ground while the earth is in good tilth.

Weeding costs are reduced by the growing of the seedlings in evenly spaced rows, since wheel cultivators and hand weeders are used to work the 4-inch spaces between the rows, eliminating much of the hand weeding necessary in broadcast-sown beds. Transplanting of seedlings grown from seed planted in this manner is not necessary because they develop substantial stems and sturdy root systems in the bed. Locust, loblolly pine, and shortleaf pine seedlings are of suitable size for planting in the field in one year, and those of white pine, red pine, and Norway spruce in two years.

Idaho and Montana Install Volunteer Fire Wardens

Unusual action has been taken by the governors of two western States, J. E. Erickson, of Montana, and C. Ben Ross, of Idaho, in issuing appeals to their citizens for voluntary aid in protection of forest lands from fire. Funds for forest protection—private, State, and Federal—are low this year, and help is badly needed in prevention of man-caused fires and in law enforcement. In each State more than 1,500 citizens who have accepted appointment from their State forester as volunteer fire wardens have become known as the Vigilante Volunteers. In accepting their aid in Montana, Governor Erickson said in part:

> Realizing their individual responsibility, these public-spirited citizens have asked for appointment as volunteer fire wardens. Determined to stop the toll of death, damage, and destruction in Montana's forests and on her forest lands, they have banded together as did the vigilante committees of pioneer days, donating their services for the common good.
>
> Operating with all the power conferred upon them by the fire and forest laws of their State, they have declared war against carelessness and incendiarism. Squarely behind them stands the power of the State and its criminal procedure applicable in the enforcement of those laws.
>
> The State of Montana, through its forestry department, welcomes the active assistance of these public-spirited citizens. It is urged that their efforts be concentrated upon education and law enforcement.

Every judge, district attorney, and justice of the peace in both States has also been enlisted in the cause of fire-law enforcement in the drive to prevent fires caused by carelessness and incendiarism.

Indiana Has Made Rapid Strides in Acquisition of State Forest Lands

Since 1925, when the Indiana Legislature placed a ½-mill tax on each $100 worth of taxable property and provided that the money thus raised be used in part for the purchase of lands for State forests, the State forest area of Indiana has grown from 2,897 acres to 22,527 acres. A total of approximately $25,000 annually was made available at the ½-mill rate; in 1927 the legislature increased the levy to 1 mill, or about $50,000 annually. The tax for forestry purposes was again doubled in 1929, providing approximately $100,000 a year. This money forms a State forestry fund which, according to the Indiana law, is "to be expended by the department of conservation in the purchase, supervision, and development of State forests and State forest lands and in the growing of forest-tree seedlings for State and private forest planting."

Indiana now has five State forests, all in the southern part of the State. They are used by 150,000 people each year for outdoor recreation; they provide game and wild-life refuges; and on them correct methods of tree planting and silviculture are demonstrated private owners of adjoining timberlands. Protec of the timber from fire and reforestation of worn and eroding lands within the forests are carried through use of the forestry fund. Three State nurseries have been established and now contain ab 25,000,000 trees which are sold at cost of productio

Fire-Line Plow Performs Well in Delaware Demonstration

By C. R. Tillotson, United States Forest Service

A demonstration of a fire-line plow was arranged southern Delaware on August 9 by State Fores W. S. Taber. The plow, of the Hester 5-disk t pulled by a 30 Caterpillar tractor, acquitted it admirably under rather difficult conditions. The f break was made by a double plowing of the strip, plow being pulled across the area and back again in same furrow. About half a mile of this type of l was constructed per hour.

In that part of Delaware there are extensive areas drained swamp land not traversed by roads wh some severe forest fires have occurred. In 1929 f burned over an area upon which there was a th stand of loblolly pine, pond pine, and southern wh cedar. The timber was not large enough or valua enough to salvage, and after the fire most of it toppl over. A very dense stand of loblolly pine reproducti sprang up which now averages about 3 feet in heig A short time ago another fire started in this area a was still burning in the peat-like soil at the time of t demonstration.

Because of the down timber, most of it half rotte and the dense stand of young growth, it was necessa to use two or three men in front of the tractor to thr some of the logs out of the way and two or three behi to clear the plow itself of logs and chunks of wood th tended to pile up in it. The plow made a furrow whi averaged about 1 foot deep and 3 to 5 feet wide. times the turf fell back into the furrow so that the li was not everywhere perfect, but it could very easi have been cleared up by two or three additional m with shovels.

* * *

Although the year's quota of 50,000 acres to be pu chased by the State of New York as part of the refores ation program under the Hewitt amendment had a ready been exceeded by acquisition of 50,253 acres up July 1, purchases will be continued during the remaind of 1932. The funds available for this purpose have n nearly been exhausted, according to Conservatio Commissioner Henry Morgenthau, jr. The work reforesting these lands is also being completed ahead schedule.

wo Protection Units Added by Los Angeles County Forestry Department

A 50-foot lookout tower and a permanent patrol ation recently constructed by the Los Angeles County orestry Department should add greatly to the effi- ency of the fire control organization in a highly hazard- us mountain area where there are many summer omes and valuable properties, according to Spence D. urner, county forester.

The lookout tower, of all-steel construction, has been ected on Bodle Peak, on the western side of the nta Monica Mountains, 4 miles west of Seminole ot Springs, at an elevation of 2,450 feet. It has an bservation radius of approximately 50 miles, including part of Ventura County.

The station is located at Lechusa on the Decker road, bout 5 miles north of the Roosevelt highway. This nit includes a station building, a 3-car garage, and cilities for the care of pack stock. The building has a ide observation range and the men on duty will be ble to act as lookouts.

The Los Angeles County Forestry Department now as 20 permanent and 4 temporary patrol stations at rategic points throughout the county, which is vided into five field divisions to decentralize adminis- ation and speed up fire suppression. There are 14 okout towers within the county, 1 constructed by the ty of Los Angeles, 5 under the control of the county re warden, and 8 within the Angeles National Forest, of which were built by the Los Angeles County orestry Department under cooperative agreements.

Mississippi's First State Forest

Created by an act of the legislature, the University tate Forest is the first tract to be set aside by Missis- ppi for production of timber and public recreation. or five years this 23,000-acre area of university land n Stone, Harrison, George, and Jackson Counties has een protected from fire by the Mississippi Forestry ommission, and according to State Forester Fred B. errill the greater part of the area contains excellent atural reproduction.

Control of the property is in the hands of the board f trustees of State institutions of higher learning, which authorized to contract with the State forestry com- mission for protection and management of the forest nd to permit the State game and fish commission to se the lands as a game preserve.

* * *

In Michigan, as in a number of other States, a new ystem of hiring labor for fighting fires has been inaugu- ated this year. Formerly emergency help was drafted nder a State law providing for the summoning of itizens to fight forest fires. Under the new plan labor is obtained from lists of unemployed men maintained by welfare agencies and paid at a rate of 15 cents an hour, one-half that formerly paid. The system is proving efficient, and it is hoped that the reduced pay and selection of fire fighters from official lists only will discourage incendiaries who set fires for the purpose of getting work.

State-Wide Forest System Recommended for Tennessee

A system of State forests in Tennessee, so situated as to serve advantageously as "forestry service stations" for the various regions of the State, is the recommendation of State Forester James O. Hazard. Each forest would ultimately contain at least 10,000 acres, according to the plan. In advocating the establishment of such a system of forests, Mr. Hazard states that they can be used to help stabilize local forest industries and to serve as centers for such State forestry activities as fire control, forestry demonstrations, reverted tax land administration, wild-life conservation, and public recreation. He also recommends the use of State forests in part for permanent game refuges and in part for public hunting and fishing grounds.

An attempt will be made to secure the passage of a law at the next session of the Tennessee Legislature to permit the use of suitable tax-reverted lands for State forests, says Mr. Hazard, as the first legal step in securing the adoption of this plan. In the meantime, the Tennessee Forest Service staff is directing public attention to the possibility of establishing such forests at strategic points in the various counties, and much interest is being shown by many local leaders.

With such a system of forests as a foundation, Mr. Hazard believes that the future forest needs of the State could be met with a minimum of expense and a maximum of public benefits.

Demonstration Forest Donated to Georgia

Forest possibilities of the sand-hill region of Georgia will be demonstrated on 100 acres of land in Richmond County donated to the State by Scott Nixon, acting for the Nixon estate. The gift was accepted by the Georgia Department of Forestry and Geological Development, and C. N. Elliott, district forester at Augusta, has been appointed to carry out the demonstration project. Bright McConnell, county agent of Richmond County, and L. S. Moody, secretary of the Augusta Chamber of Commerce, will cooperate with Mr. Elliott.

* * *

Coal operators in Indiana planted 215,200 trees this spring on stripped-over coal lands in the southwestern part of the State.

Gipsy Moth Found in Pennsylvania

Discovery of the gipsy moth in northeastern Pennsylvania, near Pittston, Luzerne County, has caused an investigation of the infested area, which was found to be approximately 8 miles by 4 miles. The extent of of the infestation indicates that the gipsy moth must have been present in this region for about 15 years. Eradication measures will be undertaken by the Pennsylvania Department of Agriculture, the State Department of Forests and Waters, and the Bureau of Plant Quarantine of the United States Department of Agriculture.

The area invaded by the insect is in an outlying district in the mountains consisting principally of cut-over land. Since there are no nurseries in the region and there have been practically no shipments of plants or trees, a quarantine will not be imposed.

Michigan Conservation Department Aids in Establishing Forests

Under authority of an act of the 1931 Michigan Legislature providing for the establishment of forests by municipalities, counties, and village or school districts, the conservation department of the State has sold tracts of land to a county and a school district for the nominal sum of $1 each. Midland County obtained 320 acres and the Beaverton agricultural school district, in Gladwin County, 40 acres. In addition to providing the land, the department will furnish pine seedlings for planting the areas from its nursery at Higgins Lake.

The terms of the sale provide that should the county or district at any time stop using the properties for forests the land will revert to the State.

◆

The 60 public parks comprising New York State's extensive park system offer exceptional recreational attractions to visitors, from ocean beaches on Long Island to the wild mountain scenery of the Adirondac
A 136-page booklet describing the facilities of the pa
illustrated with nearly 200 photographs, can be
tained free from the Publication Bureau of the St
Conservation Department, State Office Buildi
Albany, N. Y.

New Timber Protective Organizatio Formed in Georgia

A timber protective organization has been formed
Burke County, Ga., with plans to carry out a f
program of fire protection for nearly 20,000 acres
forest land, according to the Georgia Department
Forestry and Geological Development, and indicati
are that many more landowners in the county will
their holdings for protection. It was estimated th
approximately 90 per cent of the county was bur
over last year.

In northwestern Ware County the Bickley Tim
Protective Organization has been formed by owners
approximately 10,000 acres, and in Dodge County
landowners, controlling 10,435 acres, have organiz
for forest protection.

◆

Ten million trees a year will be planted by Wiscons
under a reforestation program begun this year. Th
State conservation department set out 5,348,000 tre
this spring on 5,607 acres of State land. Five milli
more will be planted during the fall season to comple
the 1932 quota.

◆

Georgia has the largest forest land area of any Stat
according to State Forester B. M. Lufburrow. Th
present commercial forest area is 22,872,000 acres,
which 1,150,000 acres contains old-growth fores
20,143,000 acres second growth, and 1,579,000 acres
forest land not at present producing valuable timber.

Education and Extension

Forestry To Be Taught in Vocational Schools of East Texas

Cooperative plans have been approved by the Texas Forest Service and the State Board of Vocational Education for the inclusion of forestry in the annual teaching plan for vocational agricultural schools in east Texas. Courses will be offered in planting and managing the farm woods and marketing farm timber.

Practically every farm in the 33 counties which constitute the commercial timber region of east Texas has its tract of woodland—46 per cent of the 7,593,118 acre
owned by farmers in this region is in timber. Whil
some of this timbered area is well cared for, much of
has been continually cut over and now produces nothin
but a small amount of fuel wood. The farm boys fro
the region who study forestry in the vocational school
will learn how to reforest denuded areas, protect th
farm woods, estimate the stand of timber, carry on silvi
cultural management to increase the annual volum
growth, and how to market the timber cut. Eac
school will have a forest area where practical instruc

on will be given, and the students will be encouraged
carry out a forestry project in their own farm woods.
It is expected that the forestry work to be started in
st Texas this fall will eventually be extended to
cational agricultural schools throughout the State.

Mount Toby Forest Has Educational and Recreational Values

R. P. Holdsworth, Professor of Forestry, Massachusetts State College

The Mount Toby Forest provides a valuable demon-
ration laboratory in forestry for the Massachusetts
ate College, by which it was purchased in 1916. The
act of 775 acres lies principally in the town of Sunder-
nd, Mass., about 9 miles from Amherst, and also fur-
shes an accessible recreational area for the region.
is in one solid block, including the peak of Mount
oby, where the State maintains a fire tower, Ox Hill,
rts of Roaring Mountain and Hemlock Hill, and the
tire 5½ acres of Cranberry Pond. Elevations vary
om 440 feet at the pond to 1,290 feet at the summit of
ount Toby.

Eleven cover types are represented in the forest,
hich is on the border line between the central hard-
ood and northeastern forest regions. They range
om mixed oaks to pure hemlock and white pine. Ex-
rimental plantations of spruce, of which only scat-
red specimens occur naturally, have been established.
recent inventory shows a growing stock of approxi-
ately 3,500,000 board feet of softwoods and 8,600
rds of hardwoods.

Courses in forestry at the Massachusetts State Col-
ge, though they do not lead to a degree, are designed
valuable auxiliaries to degree courses; they are ex-
anatory of the field of forestry for those students who
e looking forward to the study of professional forestry
one of the graduate schools. The Stockbridge School
Agriculture on the same campus, a 2-year vocational
hool, gives work in "estate forestry" which is designed
be definitely practical. The Mount Toby forest pro-
des a field laboratory for the carrying out of problems
practical and experimental forestry, and students in
oth the college and the Stockbridge School take part
and observe operations on the forest, including ex-
rimental thinning, planting, pruning, and other silvi-
ltural work.

Small sales of timber are made from time to time to
ills in the neighborhood, the owners of which are in-
rested in sustained yield and permanence of supply.
ne of these, a water-power mill, is equipped with
odern finishing machinery and good stock is turned
ut from native timber; a box factory is operated by the
me owner. The chestnut which was originally an
portant component of the forest stands was removed
me years ago and sold, returning a considerable por-
on of the forest purchase price. Timber injured by
n ice storm was also salvaged.

Type and age class maps have been made for the forest, and there is an excellent, up-to-date topographical and improvement map. A system of coordinates has been established and staked out on the ground so that it is easy to tie in various small projects which are under way. A wild-life survey is being made and map records kept in an attempt to follow the seasonal activities of the wild life of the forest.

The deep valley of Roaring Brook, running from west to east under the steep slopes of Ox Hill and Roaring Mountain, has been tentatively reserved as a natural area and recreation ground. From here the fire tower on Mount Toby, which affords a splendid view of the middle Connecticut Valley and the Berkshires, is accessible.

All visitors to the forest are welcome, but visiting foresters are not willingly allowed to depart until they have contributed a constructive idea or two toward the management of the forest.

Beal Memorial Unveiled at Michigan State College

A memorial to William James Beal, first professor of forestry in Michigan, was unveiled in the pinetum of Michigan State College, at East Lansing, on June 11. Foresters of the class of 1911 presented the memorial, a large field stone upon which is mounted a bronze tablet with a likeness of Doctor Beal and the inscription, "William James Beal, professor of botany and forestry 1870–1916, 'father of Michigan forestry,' planted this pinetum in 1896. Placed in his memory by 1911 foresters. 'Keep on squintin'.'" ("Keep on squintin'" was a favorite expression of Doctor Beal in encouraging students to further efforts with the microscope.)

The president of the college, Robert S. Shaw, in accepting the memorial, suggested that the pinetum be named for Doctor Beal. The tablet was unveiled by Harry Lee Baker, State forester of Florida, a member of the 1911 class. Other members of the class who took part in the exercises were H. B. Wales, assistant regional forester of national forest region 9, C. W. McKibbin, formerly with the Forest Service, and F. E. Wilson, chief forest fire warden of Wisconsin. G. H. Collingwood, forester of the American Forestry Association, who originally suggested the memorial, was unable to be present at the unveiling.

* * *

A record planting of 264,000 forest trees was made this year by 4-H club boys and other groups in Kershaw County, S. C., under the direction of Henry D. Green, county agricultural agent. Having no funds available for distributing the trees Mr. Green delivered them himself, hauling them in a trailer behind his automobile. The boys met him at scheduled stops and received their trees.

Four-H Club Planting Activities in New York Expanding

As a part of their 4-H forestry club projects this year, New York State farm boys and girls planted nearly 1,500,000 trees, according to J. E. Davis of the forestry department of the New York State College of Agriculture at Cornell. This exceeds the 1931 record by nearly half a million trees. The species planted are mostly white pine, red pine, Norway spruce, and white spruce, with some European larch, black locust, and white cedar planted for fence posts. Each of the 1,384 club members received 1,000 trees free from the State conservation department, and nearly 116,000 more were bought by members.

Since 1926 forestry club enrollment has grown from 105 to 1,384, and during this period nearly 6,000,000 trees have been planted, 98 per cent of which have been successful. Planting was done this year in 41 counties.

Growth Rates of Pines at Ohio Experiment Station

Results of a study of the growth rates of five species of pines growing in the Wooster Forest, Ohio, under conditions typical of many old field planting sites in the State are recorded by the Ohio Agricultural Experiment Station in its annual report for 1930–31. Of the 41 species and varieties of pines grown in this forest, those which have proved to be of most importance for reforestation work in Ohio are red pine (*Pinus resinosa*), white pine (*P. strobus*), Scotch pine (*P. sylvestris*), ponderosa pine (*P. ponderosa*), and Corsican pine (*P. nigra poiretiana*). Other plantings of these species in Ohio have shown even higher rates of growth than those attained at Wooster.

The age of the trees given in the following table is the number of years which have passed since their planting in the Wooster Forest, at which time stock was 4 to 6 years old; as may be noted, all plots shown are not the same age. The trees are uniformly spaced 6 feet by 6 feet, and each plot is composed of a single species with the exception of one in which red and white pines are mixed alternately in the rows.

	Age from planting	Average height	Average diameter	Trees per acre	Volume per acre	Average annual height growth	Average annual diameter growth
	Years	*Feet*	*Inches*	*Number*	*Cu. ft.*	*Feet*	*Inches*
White pine	18	30. 22	5. 74	608	1, 595	1. 68	0. 31
Red pine	17	21. 47	3. 90	1, 180	1, 051	1. 26	. 23
Scotch pine	18	31. 69	5. 17	840	2, 070	1. 75	. 29
Ponderosa pine	17	19. 30	3. 77	1, 129	902	1. 13	. 22
Corsican pine	15	31. 27	4. 45	1, 180	2, 068	2. 08	. 30
White pine[1]	15	25. 50	4. 09	349	436	1. 70	. 27
Red pine[2]	15	24. 70	4. 69	572	870	1. 65	. 31

[1] Grown in mixture with red pine.
[2] Grown in mixture with white pine.

The Corsican pine shows the most rapid an height growth, but this advantage would be m than offset on many sites by its restricted soil requ ments. Scotch pine also shows a high growth r Red pine, although having a somewhat lower gro rate, has other qualities, such as hardiness, adaptabi to a wide variety of soils, and good growth form, wh make it a very desirable tree for reforestation purp in Ohio. As the plot of mixed red and white p indicates, the red pine seems to thrive better in m ture with certain species than in pure stands; thi especially true when it is grown in mixture w Norway spruce.

Since these data are on comparatively young stan the results should not be considered as applicable older stands until further information is obtained.

Signs on Infected Trees Tell Story Blister Rust

A graphic demonstration of the damage being d by blister rust to white pines in New York State is be seen by travelers on the road to Ticonderoga. fected trees on the property of O. C. Benjam Clemons, N. Y., have been labeled by the exhi specialist of the State conservation department, Geo E. Stevens, so that motorists can see, without stoppi the devastating effects of the disease.

Yellow placards on infected trees state "Blister r is killing this white pine," while on trees already de the signs proclaim "Blister rust has killed this whi pine." Tags have also been placed on near-by goo berry bushes calling attention to their function as h to the blister rust. Posters describing control me ures for the disease and inviting requests for furth information are placed on the area, and a box co veniently located contains pamphlets on the subject.

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An extension course in lumber to be given at t University of California is sponsored by the Hoo H Club of Oakland, Calif. Emanuel Fritz, professor forestry at the university, will conduct the cour which will probably begin in October. An enrollme fee of $1 and a tuition fee of $6 for each semester of hours will be charged. The instruction will be alo lines of practical interest to lumbermen, the subjec announced including physical properties of woo methods of seasoning, and types and causes of defect

⁂

A goal of 1,000,000 forest trees to be planted in 193 as bicentennial memorials to George Washington h been established by 4-H clubs of Ohio. Half tha number has already been planted, and Extensio Forester F. W. Dean expects that the other half will b set out by club members during the fall plantin season.

North Carolina Demonstration Tours Bring Results

So successful has been the farm forestry demonstration work of R. W. Graeber, extension forester of North Carolina, that one of the several county-wide tours which he conducted this summer was attended by foresters from two other States who came to observe his methods. State Forester H. A. Smith and N. T. Barron, assistant State forester, of South Carolina, DuPre Barrett, extension forester of Georgia, H. Y. Forsythe, district forester at Aiken, S. C., and W. C. Hammerle, district forester at Spartanburg, S. C., accompanied Mr. Graeber on an all-day tour of Gaston County which included an inspection of four farm-woods thinning operations, a timber estimating contest, a dinner given by the Kiwanis and Rotary Clubs of Belmont, N. C., and visits to successful plantations of shortleaf, loblolly, and longleaf pines belonging to R. L. Stowe, chairman of the Gaston County board of supervisors.

* * *

"Forest Planting on the Farm," by S. N. Spring and C. H. Guise, Cornell Bulletin E–226, which tells of the different kinds of trees suitable for planting in New York State and how and where to plant them, may be obtained free from the office of publication of the New York State College of Agriculture, Cornell University.

Forest Service Notes

Spiral Grain Tends to Cause Warping in Sand Pine Lumber

By Benson H. Paul, U. S. Forest Service

Prevalence of spiral grain in sand pine (*Pinus clausa*) from the Ocala National Forest, Fla., suggested the possibility of a relationship between the presence of spiral grain and the excessive warping which has been reported in lumber cut from this species. Studies made at the Forest Products Laboratory confirmed this suspicion by showing a strong tendency for spiral grain to cause warping in sand pine lumber and in addition indicated a method of drying which may prevent most of such warping.

In making the tests at the laboratory, measurements were first made of the spiral of the grain of fifteen 2-foot bolts, cut from different trees. In three-fourths of the bolts the spiral was more than 1 inch per linear foot and in one-third a spiral of more than 2 inches per linear foot occurred. The maximum spiral found was 3.2 inches per foot of length. The spiral was then measured on slabs from eight sand pine logs, of which two were 7 feet 4 inches long and six were 4 feet long. Spiral grain in these logs ranged from 0.75 to 2 inches per foot of length.

In the test to establish relationship between spiral grain and warping, the eight logs already measured were slash sawed into 1-inch boards and the boards numbered in sequence, dressed to three-quarters of an inch thickness, edged, and the ends sawed off squarely. The lumber was divided into two lots, alternate boards from each log being taken in the order of sawing, and the lots placed in a kiln for drying. One lot was carefully piled on stickers and the boards weighted down with about 700 pounds of iron. The boards of the other lot were stacked on top of the first and so piled that the individual boards carried no weight and each piece could warp without restriction during the drying process. The lumber when put into the kiln contained about 50 per cent of moisture, based on its weight when oven-dry, and was dried to an average moisture content of 7.4 per cent. (For commercial use it would be unnecessary to dry sand pine to a moisture content below 12 per cent.)

Following the drying, the amount of warp in each of the loosely piled boards was measured by holding a corner of one end of the board firmly against a level base and recording the deflection from the level surface at the diagonally opposite corner of the board.

In the boards held in place during drying warp was greatly reduced, and even after the weights were removed and the lumber exposed to atmospheric conditions for a period of 10 weeks no excessive warping occurred, although the moisture content of the lumber increased to 12.3 per cent. This would indicate the possibility of preventing most of the warping by the use of weights while drying. In a tall pile the weight of the lumber itself would tend to hold a large portion of the boards flat.

The warping in the loosely piled lumber, measured immediately after drying, averaged 2.20 inches for the longer boards and 1.68 inches for the shorter boards, on the basis of a board 6 inches wide. The narrow boards cut near the outside of the logs warped more than the wider boards which were cut through the central portion. This was to be expected since the inner boards have a smaller slope of spiral and are more nearly quarter-sawed, both factors reducing the amount of warping. The logs which showed the most spiral showed also the greatest warping.

During the subsequent 10 weeks of storage the warp in this lot of boards decreased somewhat, but the average amount was still four to eight times that of the boards held down by weights during kiln-drying. At a moisture content of 12.3 per cent the average warp was 1.79 and 1.18 inches, respectively, for the long and short boards loosely piled during drying, and only 0.19 and 0.29 inch, respectively, for the long and short boards held in place by weights.

National Forest Created in Green Mountains

A new national forest was established by proclamation of the President on April 25, 1932, and designated the Green Mountain National Forest. The purchase of only 31,228 acres within the area in the State of Vermont described by the proclamation has so far been authorized by the National Forest Reservation Commission, but when completed by expected additional purchases the new forest will contain nearly 100,000 acres on the eastern and western slopes of the main Green Mountain Range. These lands are located in a picturesque and rugged region in Rutland, Windsor, Windham, and Bennington Counties. For the present the forest will be administered by officers of the White Mountain National Forest.

Pinus Peuce—Balkan or Macedonian Pine?

By W. A. Dayton, United States Forest Service

Increasing interest in the growing in this country of *Pinus peuce* as a substitute for *P. strobus* because of its reported immunity from or high degree of resistance to the white pine blister rust suggests the desirability of adopting as soon as possible a standard English name for the species.

In Standardized Plant Names, *Pinus peuce* is called Macedonian pine; the name Macedonian white pine is also in use. Balkan pine seems to me a more suitable name, since this is essentially a species of the Balkan Mountains and Balkan Peninsula. There are, it is true, perhaps as many as nine different pines occurring naturally in the Balkan Peninsula besides *Pinus peuce*. These are Aleppo pine (*Pinus halepensis* Mill.), *P. heldreichii* Christ (perhaps only a synonym of *P. leucodermis*), graybark pine (*P. leucodermis* Ant.), mugho pine (*P. mugo mughus* (Willd.) Zen., syn. *P. montana mughus* Willd.), shrubby Swiss pine (*P. mugo pumilio* (Willk.) Zen., syn. *P. montana pumilio* Willk.), Austrian pine (*P. nigra austriaca* Aschers. & Graebn.), cluster pine (*P. pinaster* Ait., syn. *P. maritima* Poir.), Italian stone pine (*P. pinea* L.), and Scotch pine (*P. sylvestris* L.). It should be noted, however, that three of these (*P. halepensis*, *P. pinaster*, and *P. pinea*) are essentially Mediterranean and coastal species, *P. heldreichii* is (so far as known) confined to Albania and Mount Olympus, the occurrence of the northern *P. sylvestris* in the Balkans is still uncertain, while *P. nigra austriaca* reaches the Balkan Peninsula only on its extreme northwestern fringe and is not truly a Balkan species. While the tw varieties of *P. mugo* mentioned occur in the Balka region they are, as is the species, admittedly mo typical of the Swiss Alps and of central rather tha southeastern Europe. *Pinus peuce* is the one ou standing indigenous pine of the Balkan Mountains an the Balkan Peninsula, and, so far as known, is foun naturally nowhere else. Balkan pine, therefore, woul appear to be a more appropriate name for it tha Macedonian pine.

Another objection to the term "Macedonian" is tha the exact connotation of Macedonia is obscured by th more or less kaleidoscopic changes in the boundarie of that region which have occurred from the days o Philip and Alexander to our own time; the Balkan region is fixed topographically and is more permanen geographically. Finally, Macedonian is a pentasyllabi word; Balkan has the advantage of being three syllable shorter.

Dr. Frederick V. Coville, botanist of the Bureau o Plant Industry and a member of the American Join Committee on Horticultural Nomenclature which is a present preparing a second edition of Standardize Plant Names, tells me he approves my recommendation and will advocate the use of Balkan pine for *Pinu peuce* in the new edition.

Improved Nail Invented by Forest Products Laboratory

A new type of nail treatment intended to increase the strength of nailed wooden joints has been invented at the Forest Products Laboratory, Madison, Wis The new treatment is accomplished by chemical means and results in minute pitting or etching of the nail surface which causes a very high frictional contact with the wood fibers for a given weight of nail.

The improved nail is intended for use where there is need for increased resistance to lengthwise or sidewise pull. The holding power developed may range from two to three times that of a similar untreated nail, and its advantage over the ordinary type of cement-coated nail is also marked. Unlike a coating, the pitted surface will not rub off in handling or driving the nail. When redriven after being pulled out of a piece of wood the nail shows as high a resistance to withdrawal as when first driven.

A patent, to be dedicated to the free use of the people of the United States, has been applied for on the new nail treatment.

* * *

Receipts from the national forests for the fiscal year ended June 30, 1932, were $2,294,247, less than half the amount collected in the preceding year. The receipts, derived from timber sales, grazing fees, and other uses, amounted to $4,993,320 in 1931 and $6,751,553 in 1930.

National Forests Renamed

In order to avoid the confusion arising from the similar designation of a national forest and a national park in the same region, the names of two national forests have been changed by Executive order. These are the Shenandoah and Crater Forests, whose names conflicted with those of the Shenandoah and Crater Lake National Parks. The Shenandoah, in Virginia and West Virginia, has been renamed the George Washington, and the Crater, in Oregon, becomes the Rogue River National Forest.

The George Washington Forest was chosen as a memorial to the first President because of its location in a region with which he was familiar and which he in part surveyed. The tract stretches for nearly 100 miles along the summit and slopes of the Shenandoah Mountains and for some distance along the Massanutten Range, and supports extensive stands of timber. It constitutes an important part of the drainage area of the Shenandoah and Potomac Rivers and is being developed for increasing recreational use.

The California National Forest, also, has recently received a new name by Executive order, becoming the Mendocino Forest. This name is historic in the northern California region where the forest is located, having been given in 1543 to a prominent cape on the north California coast by the explorer Cabrillo in honor of Antonio de Mendoza, a governor of Mexico.

Another recent Executive order consolidates the Toiyabe and Nevada National Forests, the lands in the former being transferred to the Nevada.

Customers Cut Their Own Wood on the Nebraska Forest and Reduce Thinning Costs

Thinnings in the older plantations on the Nebraska National Forest are being done by the local residents, who receive the wood in return for their labor. On the basis of the cost of experimental thinnings by permanent employees, the equivalent of $33.60 worth of work per acre was performed by the applicants for wood on 84 acres during the winter of 1931–32, while the cost of marking and supervision by the forest officers was less than $4 per acre.

The Nebraska National Forest was established in 1902 for the purpose of accomplishing two things: To demonstrate that trees could be successfully grown in the sand hills of Nebraska which are obviously unsuitable for growing farm crops; and to furnish a local permanent source of timber and wood products for the citizens of a region naturally devoid of trees. There are 11,199 acres of sand hills within the Nebraska Forest successfully planted to trees to prove the first point, and about 1,250 additional acres are being afforested annually. In some of the older plantations the time arrived in 1929 when the struggle for existence between the trees became serious, and to maintain maximum growth some trees had to be removed. Here was an opportunity for people living near the forest to obtain wood for use as fence posts and fuel. The thinning was done by ranger labor and the wood sold, but when the cost was computed the resulting addition of $30.56 per acre to the investment was greater than the final product could carry. The demand for wood from the forest was increasing, more thinning was needed, and finally the idea of exchanging the product for the labor was evolved.

Those desiring to obtain wood by cutting it in the forest are given permits with simple requirements. Trees to be cut or pruned are marked by forest officers, and certain areas are assigned to each permittee. It was found that many of the applicants had already examined the plantations and selected the areas in which they wanted to work.

One of the requirements is that all slash resulting from the cutting and trimming of the trees must be scattered evenly over the surface of the designated area except that every fifth lane, or strip of land between adjacent rows of trees, must be kept clear. Research experiments have shown that slash left on the ground after thinning increases the fertility of the soil and helps keep down the grasses which tend to come in and are a greater fire hazard than the slash. Leaving these lanes clear of all slashing is primarily for fire suppression purposes. They are also useful as skid trails in removing the wood.

The permittees take pride in the cutting work and try to follow requirements to the letter, some going even a step or two further. One man found that he could avoid injuring the bark on trees growing in the skid lanes by placing burlap around the butts. Another took such extreme care in pruning that the scars where limbs had been removed looked as though they had been polished.

Timber Retreats When Man Mistreats

By A. E. Wieslander, United States Forest Service

Steadily, though slowly, the ponderosa pine belt in Eldorado County, Calif., is being pushed back and up the Sierra slopes. Because of man and his occupation of the land, there has been a retreat from the 1,000-foot to the 2,500-foot level on a 30-mile front, a distance of nearly 10 miles, leaving a deforested area of 162,000 acres. In addition there is an area of second growth nearly as large, three-fourths of which is less than half stocked. And this condition is typical not only of the entire western front of the pine belt in the Sierra Nevada but of the Douglas fir belt of the California coast ranges.

The change from forest to deforested land has come about very gradually. Most of the present residents of Eldorado County do not know that the region was ever timbered. But a recently completed survey of the natural vegetation of Eldorado County discloses indisputable proof of the former occupation of this land by pine. Scattered relict individuals and groups of ponderosa pines bear mute evidence of former forests, as does also the presence of the California black oak, which invariably grows with this species at its lower limits and survives by sprouting when the pine succumbs to the ax and fire. Several instances were found where the boundary line between second growth and nonforest cover coincided with property-line fences, and the cemeteries of Eldorado and Frenchtown have preserved excellent second-growth pine stands. Some of the deforestation may be attributed to the Indian, but undoubtedly the larger part has occurred since the advent of the white man, whose first inroad probably began with the establishment by Capt. John Sutter of a sawmill at Coloma. In this mill race, gold was first discovered in January, 1848, by James Marshall. The feverish mining activity which followed gave great impetus to lumbering, and by 1855 the first official record shows a total of 39 sawmills in the region. For the next decade 35 to 40 sawmills were constantly in operation. Such names on the map of the county as Sawmill Creek, Sawmill Ravine, and Shingle Springs testify to the lumbering activities of that period. By 1870 the lower ponderosa pine belt had been largely logged off.

What use has been made of this land? In 1863 as much as 31,000 of the 162,000 acres was under cultivation. With the decline of mining much of this, too steep or too infertile to farm, was abandoned. The land still cultivated constitutes about one-tenth of the area; two-fifths of it, covered with grass and grassy woodland, is now used for grazing; while practically half is scrub woodland, worthless for timber and too dense or too brushy for good grazing.

This deforested, uncultivated land, now worth little to anybody, would have come back to pine timber except for the many fires, accidental and willful, which have occurred. The prospector set fires to expose gold-bearing outcrops concealed by the young timber growth. The present owner of foothill land, seeing no present or prospective market for second-growth timber in his generation, believes that the only possible financial return is from grazing and accordingly makes fall burning an annual practice. By this means he hopes to increase forage and remove inflammable material, thus preventing the dangerous summer fires which threaten his forage supply, stock, fences, and buildings. Temporarily, fires may give him grass, but the ultimate outcome is an impoverished soil supporting only the worthless brush and scrub trees. As a further means of replacing timber with grass, he cuts or girdles remaining trees. That it requires from 12 to 28 acres of this burned-over, deforested land to feed one cow for an 8-month period is significant.

Contrast the present use of this land with its timb producing potentialities, shown in the following ta by site index and corresponding yield per acre in years if fully stocked:

Site index	Per cent of area	Productive capacity in 60 years
		Board feet per acre [1]
50	22.8	24,000
60	52.6	35,000
70	20.7	50,000
80	3.4	69,000
90	.5	88,000
	100.0	[2] 37,018

[1] By the international rule (⅛-inch kerf).

[2] Weighted average.

Site index, or the height attained by the avera second-growth trees at 50 years of age, is the measu of the productiveness of land for growing timber. was possible to ascertain the growth capacity of th 162,000 acres of deforested land by measurements the height and age of hundreds of the relict secon growth trees. The possibility of such excellent timb yields from low-value grazing land points to the desir bility of reforestation.

The situation in Eldorado County is only an aggra vated example of what has happened in many fore areas with somewhat similar history. A grave nationa problem of land use is presented by lands now practi cally useless which are capable of producing again, a they once did, valuable timber.

Natural Areas and Experimental Trac Designated in National Forests

A tract of 1,176 acres of wild land within the Chippewa National Forest in Minnesota has been set asid by the Forester as the Pine Point Natural Area. I accordance with established policy, characteristi plant and animal life on this tract will be preserved so far as practicable, in an unmodified condition. Th area contains a typical stand of virgin pine which i more nearly in its natural state than the timber on any other part of the Chippewa Forest. In general, th merchantable timber is represented by Norway, white and jack pines, white birch, and red oak. Aspen i closely associated with pine as the result of the last fire, which occurred about 35 years ago. Historically the region is connected with the pioneer period o national development. Chippewa Indians are still the principal inhabitants, the population of the nearest settlement, Onigum, known as the Indian Agency, about 2 miles south of the natural area, consisting of about 75 Indian families. Indian allotment lands adjoin the national forest, occupying a portion of Pine int, and the forest is used by the Chippewas for nting and fishing. Such use of the natural area by em will not be restricted.

Another area set aside under the same regulation is a ct of 1,000 acres in the Inyo National Forest, Calif., be known as the Indiana Summit Natural Area. cated on the slopes of Bald Mountain at an eleva- n of 8,000 feet, 6 miles south of Mono Lake, this a contains a typical virgin forest of Jeffrey pine in ich no lumbering has ever been done. None will reafter be allowed, and the region will be maintained its natural state.

A new experimental forest area, to be known as the rker Creek Experimental Forest, has been with- awn from the Tonto National Forest in Arizona. re the Southwestern Forest and Range Experiment ation will conduct studies in erosion and streamflow, h special emphasis on the relationship of grazing water. The tract of 1,790 acres lies in the drainage the Roosevelt Reservoir; the vegetation is mostly ush, with some grass and timber.

actors in the Natural Distribution of Tree Seed

Reporting on experiments in which he used seed of ny tree species, the late Howard W. Siggins, asso- te silviculturist at the California Forest Experiment ation, wrote:

> Any group of seeds liberated from one tree at the ne instant will tend to be distributed in a straight e to leeward of the tree. If all seeds produced by ree were to be released at one time this would result in an undesirable concentration of seeds in a limited area and a total lack of seeds in other areas. Nature has guarded against any such wasteful process. A pine cone, for example, opens one scale at a time. As the scale opens the two seeds which were borne under it are permitted to drop out. Ordinarily several days elapse between the escape of the first and last seeds from any one cone. Furthermore the cones on different parts of the same tree do not all open at the same time. One tree may be casting seed for several weeks. Variations in direction and velocity of the wind during this period result in widespread scattering of the seeds. Where the winds are rather consistently from one direction the area seeded will be in the form of a V with the apex at the base of the tree. The areas of the concentric radial zones increase as the squares of the radii. The greatest number of seeds per square foot of ground will therefore be found quite close to the base of the tree. The concentration of seeds will then decrease rather gradually with increasing distance from the tree until the point is reached where the average seed is dropped by the wind of average velocity. Beyond this point the concentration of seeds will diminish very rapidly.
>
> A forester who wishes to plan carefully the distribution of seed trees on a cut-over area must consider not only the velocity but also the variability of direction of winds which are to distribute the seeds. The ideal condition would exist when winds might be expected to blow from all directions. Each tree would then stand in the center of a circle and would seed the maximum area without overlapping. Where the prevailing winds come principally from one direction, however, the seed distribution will be in long narrow V's and considerable overlapping will be necessary to provide for completely covering the ground * * *.
>
> Under certain unusual conditions tree seeds may be carried for many miles. Possibly this may not occur with one seed in a million, but the fact is of great interest to the dendrologist in explaining the occurrence of scattered specimens far from seed trees.

General Forest News

Pine Beetles Killed by New Method

F. P. KEEN, Bureau of Entomology, and FRANK SOLINSKY,[1] National Park Service

More effective and cheaper methods of killing pine etles are constantly being sought by entomologists d foresters who have to deal with these destructive aber pests. The use of oil by the United States rest Service in national forest regions 1 and 4 in rning the bark of standing or felled lodgepole pines ested with the mountain pine beetle led to the adap- ion of this method in treating infestations in the ater Lake National Park. After many trials with ferent oils, equipment, and modes of application, the lowing practice was adopted.

In the Crater Lake Park most lodgepole pines are too l for the infested length to be burned without felling. The trees were felled in such a position as to raise them off the ground and clear of brush and green timber. They were then limbed, and the top cut off at the end of the infestation. A small fire was started on the base of the log, a spray stream of oil directed against it, and the fire carried up one side of the bole and down the other. The log was then given a quarter turn, and the unburned sides treated in the same way. One man with a shovel followed the burner and extinguished any fire that dropped to the ground. By never allowing any ground fire to start, the escape of fire and scorching of near-by trees was almost entirely avoided. As in the similar work on the national forests, it was considered that the log had been adequately burned when the bark scales showed white ash margins. Within 5 or 10 minutes the fire was completely out, only the bark was scorched, and the beetles were killed.

The burning equipment used in the project consisted of a 5-gallon back-pack pump, similar to the standard pump required for fire protection, fitted with a 3-foot extension and a nozzle designed to vary the character of the oil stream. Several 5-gallon cans were necessary for transportation of oil to replenish the pump. Ordinary fuel oil with a gravity of 27 and a flash point of 225° F. was found to be the most satisfactory both from the standpoint of slowness of burning and cost.

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[1] In charge of insect control, Crater Lake National Park.

It was found that five men made the most economical size of burning crew—two fallers and three burners. The burners interchanged positions, alternately burning, extinguishing fires, and packing oil in order to equalize the burden of the various jobs. The cost of the project varied from 68 cents to $1 per tree, depending upon the thickness of the ground cover, the extra fire precautions which had to be taken, the distance from the oil supply, and the ability of the crew to adapt the method to each particular situation. At about 5 cents per gallon, the cost of the oil used per tree was almost negligible, one-half to three-fourths of a gallon being sufficient.

In places where the stand is open and the trees are relatively short and have thin bark, the burning-standing method of beetle control can be used. It can probably be used in Crater Lake Park to good advantage in the treatment of short, thick, and knotty whitebark pines which are very difficult to fell and peel.

The oil-burning method was also tried by national park officers in the treatment of ponderosa pine infested with the western pine beetle. When the amount of oil used on the stems of felled trees was increased the bark and cambium layer became so hot as to burn one's hands when touched, and all of the beetles in and under the bark were killed. The results were so successful and the cost so greatly reduced in comparison with the old hand-peeling and burning that the method may find an important place in the control of the western pine beetle in ponderosa pine as well as in combating the mountain pine beetle in lodgepole pine stands.

Oldest Pine Plantation in the South Found in Georgia

By W. R. Mattoon, United States Forest Service

Where is the oldest planting of southern pines? For the past 10 years it has been supposed that the shortleaf pine plantation near Griffin, Ga., was the first, but recent investigations show that this grove is after all not the oldest, though Georgia apparently still holds the record.

Among the low hills about 8 miles south of Augusta, Ga., just west of the Savannah River flats, is the old and well-known Windsor Spring, which flows a large stream of cold sparkling water. Here 4 acres of shortleaf pines stand in regular rows. The annual rings tell the story that they are 64 years old and were probably planted some time between 1870 and 1872, when they were 2 to 4 years old. No definite record of the planting of the pines has been found, but since it is known that the land was owned at that tim Adam Johnston, a planter and manufacturer who there until his death in 1895, it is probable that were planted by him. The trees are now sp approximately 20 feet by 20 feet in regular rows. height they vary from 60 to 85 feet, with an ave height of 73 feet. In diameter at breast height trees range from 14 to 25 inches, with an avera 16 inches. Because of the rather wide spacing shortleaf pines during the first 25 years or so, the tr are somewhat roughened by knots which mark location of former branches.

The trees are mostly shortleaf pine (*Pinus echi* with a few loblolly pines (*P. taeda*). The area of present plantation is about 4 acres, but the orig acreage has clearly been decreased by cutting roads, and probably also by opening up one or fields for cultivation.

Some Effects of Drought

Effects of the drought of 1930 on pine and sw forests in Minnesota, with particular reference to Chippewa National Forest, were made the subject survey by Hardy L. Shirley, of the Lake States Fo Experiment Station. He found that young gro suffered most severely, the mature trees of all spe escaping with no noticeable damage. Of the pi jack pine was most susceptible to injury, and lo were heavy for young black spruce seedlings roote the upper layers of moss in the swamp forests. Lo in aspen were comparatively light.

Counts of 1930 seedlings made on a large numbe sample plots showed that only a few survived the su mer, and these were all on artificially prepared s spots. Plantations established as early as 1925 1926 sustained losses of 30 to 50 per cent. This probably not excessive, however, in view of the def in precipitation, which for the year 1930 was 5.15 10.9 inches below the annual average of 25 inches weather stations in and near the Chippewa Forest.

Drought losses in pine forests decreased in sever with increasing height and density of reproducti For areas with a stocking of 10,000 trees per acre los were only about one-tenth as great as on areas w fewer trees. Poorly stocked stands which could le afford losses suffered most severely from the drought

The theory that large trees tend to deplete s moisture and that consequently the forest prese unfavorable conditions for plant survival during peri of drought was not borne out by Doctor Shirle findings. The unfavorable influence of the root com tition of older trees was more than offset by the be ficial effects of their shade. This was due to the p tection afforded by the upper canopy against excessi transpiration which, when added to depleted s moisture, causes much of the fatality among the small etation. It would seem therefore that in regions ere droughts are likely to occur adequate shade uld be maintained until reproduction is sufficiently anced to withstand high transpiration, after which s no longer beneficial and should be cut or thinned

n contrast with the above conclusions, C. E. Behre, ector of the Northeastern Forest Experiment Sta-, in noting the effects of drought on transplant beds vhite pine and Norway pine at Cornwall, Conn., in summer of 1929, found that density, instead of reasing losses, increased them. The transplanted llings were 2–0 stock set out in the spring of 1928, se in one bed of each species being spaced at 3-inch rvals and those in another bed at 1½-inch intervals. closely spaced white pines were almost all killed by drought and approximately 30 per cent of the dense way pines died, while the seedlings of both species he 3-inch beds suffered practically no losses.

hese observations are not, however, entirely incon-ent with those made in Minnesota, since in the case he Connecticut transplant beds there was no over-d shade whatever. The mutual protection afforded lense growth could not overcome the disadvantages reater competition for soil moisture.

ew Tree Disease Active in New York

disease which attacks white and red pines has le considerable headway in plantations owned by city of Rochester, N. Y., on Hemlock and Canadice es in southwestern Ontario County and also in te pine plantations of the Norwich Cemetery Asso-ion at Norwich, where it was first noticed in 1928. ut 40 acres of the Rochester plantations are affected it. Harlan H. York, investigator and consultant st pathologist of the New York State Conservation artment, is conducting studies of the disease, which ears to be caused by a fungus, as yet unidentified, rating on the base of the tree trunk and the adjacent ions of the roots.

profuse exudation of resin at the base of the trunk, ch permeates the soil for several inches around the , is caused by the disease through enlargement and aking down of the resin pores in the inner bark and he wood. It is considered possible that the infec-may spread through the ground, as living trees ounding one killed by the disease were all found to nfected. Trees live three to five years after being cked.

heories as to the cause of the trouble have so far n proved negative by the investigation. It is ught that it may be of foreign origin, in which case, s Doctor York, "its history may be found to be ilar to that of other plant diseases introduced into country from abroad, which have had a period of y development of several years, followed by great vity when the fungus becomes adapted to its new ironment."

Effectiveness of the Burning-Standing Method of Barkbeetle Control

By JAMES C. EVENDEN, United States Bureau of Entomology

To determine the effectiveness of the charring of the bark of standing trees as a means of controlling outbreaks of the mountain pine beetle (*Dendroctonus monticolae* Hopk.), a study was conducted by the Bureau of Entomology in the Wyoming National Forest where this method was being practiced in lodgepole pine stands. The infested trees were sprayed with an inflammable oil and then burned, the oil being applied by small pressure tanks which can throw it to a height of 26 or 28 feet with the aid of a 6-foot pipe extension. All trees that could not be burned to the height of the infestation were felled and treated.

In studying the results of the project a large number of trees, selected as representative of the area, were felled and examined. Some of those already felled were also examined for additional data. Conclusions reached were as follows:

In order to destroy the insects beneath it, it is necessary to burn the bark so severely that the edges of the bark flakes turn white.

It is impossible to determine from the ground the actual height of the infestation in standing trees.

The existence of a relationship between the average height of infestation and the diameter of the bole is evident. In the larger and taller trees the broods reach a greater height.

Infested trees occurring in groups are likely to be infested to a greater height than single trees.

Trees with heavy basal attacks show higher average infestations, while trees with one-sided attacks seldom have very high infestations.

Treatment of trees to a 7-inch top diameter will destroy 99.7 per cent of the infestation; to an 8-inch top, 98 per cent; and to a 9-inch top, 95.3 per cent.

The treatment as conducted on the Wyoming National Forest was 96.1 per cent effective; if no trees had been felled for treatment it would have been 90 per cent effective. A straight burning-standing method of control, therefore, would seem to be an economical procedure where funds are limited, since by this means the greatest number of insects may be destroyed for each dollar expended; but to effect a complete clean-up of an infestation all trees which can not be burned to a 7 or 8 inch top diameter should be felled for treatment.

* * *

Sitka spruce, the largest of the native spruces of Canada, because of the uniform structure of its long, straight fibers and their even distribution through the wood, possesses an unusual quality of resonance. It is much utilized in the manufacture of piano soundboards, parts of other stringed instruments, and organ pipes.

The Copeland Resolution

In response to Senate Resolution 175, proposed by Senator Copeland, of New York, March 2, 1932, and adopted by the Senate on March 10, the Secretary of Agriculture, through the Forest Service, is preparing for submission to the Senate when it reconvenes a report which will cover the whole national forestry problem and suggest a constructive program for its solution. The text of the resolution follows:

Whereas the consumption of the forests of the United States has progressed to a point at which their early exhaustion is threatened; it being estimated (1) that over 50 per centum of all the softwood lumber cut in the United States has been cut during the last thirty years, (2) that, with a population almost 60 per centum greater to-day than at the beginning of the twentieth century, the United States has been using nearly three hundred billion feet of softwood lumber alone during each decade since 1900, (3) that in 1928, with a population of more than one hundred and twenty million, the annual cut of softwood lumber alone was twenty-eight billion feet, and (4) that there now remain in the territory east of the prairies, only about twenty-five billion feet of original timber; and

Whereas there are great areas in the United States, which, aside from their underlying minerals, are suitable for forestation only; it being estimated that of the great land area constituting the thirteen Northeastern States, from Maine to and including the two Virginias, about one-half, or seventy-five million acres, are suitable for forestation only; and

Whereas proper utilization of such lands as a public domain under proper control, would to some extent effect a modification of the climate, substantially effect or control the run-off of water, supply a cheap and dependable supply of lumber, and, through development, with roads, camping places, leased hunting and fishing rights, and other opportunities for social activities, would afford valuable resources for entertainment and improvement in national health, besides giving wealth-producing and steady employment to a large number of persons; and

Whereas it is desirable (1) that a coordinated plan be immediately developed for the cooperation of the Federal and State Governments in the utilization of such lands suitable for forestation only, (2) that information necessary as a basis of legislation be compiled, and (3) that recommendations for legislation be made: Therefore be it

Resolved, That the Secretary of Agriculture is requested (1) to advise the Senate as soon as practicable whether, in his opinion, the Government should undertake to aid the States in the utilization for forestation purposes of those areas of land in the United States suitable for forestation only, and (2) to state fully his reasons for any opinion which he may submit, together with the facts upon which such opinion is based.

Nekoosa-Edwards Plantings Show Good Survival

The Nekoosa-Edwards Paper Co., of Port Edwards, Wis., produced more than 4,000,000 forest tree seedlings and transplants in its Nepco Lake nursery in 1931 for general planting purposes. The 1931 inventory at the company's Chippewa River nursery showed a total of 1,892,000 seedlings of such species as northern white pine, Norway pine, jack pine, and white spruce. During the year the company planted trees on 1 acres of land and plowed 1,460 acres to prepare i planting in the spring of 1932.

Survivals in the forest plantations establishec this company from 1926 to 1929, inclusive, ra from 83 to 96 per cent. Its 1930 and 1931 plantat in central Wisconsin were less successful, presum as a result of the drought existing there in each of two years. On about 1,100 acres, or one-third of area planted in those years, survival was found t less than 70 per cent. Accordingly this portion of area was replanted in the fall of 1931.

In Ashland County, Wis., survival in Neko Edwards plantations has never gone below 85 per and has sometimes gone as high as 98 per cent.

Rodents Observed at Work on Blis Rust Cankers

Several eyewitnesses have arisen to tell of roc action on white pine blister rust cankers. Hereto the marks of such action have been observed by m persons who did not, however, succeed in catching animal at work. B. H. Nichols, blister rust con agent at Lewis, N. Y., states that he has often s red squirrels busily gnawing at the cankers, an similar statement comes from a Mr. Getchell who o some heavily infected northern white pine at Belgra Me. Blister rust control agents cite instances in wh a cottontail rabbit and a field mouse were seen at w on cankers. Rodent work is observed to have had sc beneficial results in reducing the spread of spores.

◆

Blister-rust infections have been found on pines the Arnold Arboretum, according to E. M. Brockw Massachusetts blister rust agent. An inspection of 5-leafed pines in the arboretum made in Decemb 1931, disclosed two infections on white pine (*Pi strobus*), one on western white pine (*P. monticola*), one on sugar pine (*P. lambertiana*). A trunk can on *P. lambertiana* was so completely caked over w pitch that it was not possible to determine with ab lute certainty whether it was a blister rust canker or work of another fungus. In May, 1932, another spection was made and aecia were found developing the canker, which apparently confirms its identificati as blister rust.

◆

Temporary increase in the rate of germination red pine seed which had been immersed in alcohol the purpose of floating off dead and empty seed reported by Henry I. Baldwin in the American Jour of Botany. After being stored for several mont however, these seed fell below untreated ones in g mination rate. A second immersion in alcohol pr duced regeneration of sprouting capacity, but for even shorter period.

/ell-Fed Pines Produce More Cones

By E. W. GEMMER, United States Forest Service

An increase in fruitfulness is one of the changes served in longleaf pines on the Choctawhatchee ational Forest, Fla., during the course of soil fertilition and irrigation experiments conducted by the rest Products Laboratory from 1927 to 1931. Different groups of pines have been treated with pineedle mulch, with sodium nitrate, with water, with dium nitrate and water, and with complete fertilizer d water. Concurrently with observations on sumerwood formation and other features of growth, a unt has been made yearly of cones produced by the ees on the study plots. The results of these counts e as follows:

Treatment	Number of trees	Number of cones produced per tree				
		1927	1928	1929	1930	1931
ne	17	0.4	0	1.2	0	2.1
ulch	6	...	...	...	...	11.0
dium nitrate (no irrigation)	7	0	0	5.1	0	15.8
igation	7	2.0	0	16.4	0.9	24.6
dium nitrate and irrigation	9	0	0	14.7	7.0	53.6
mplete fertilizer and irrigaion	6	0	0	26.2	0	[1] 61.6

Average for 3 trees (3 trees were killed by Ips beetles in 1930–31).

Foresters have as a rule preferred trees of more than erage vigor as the source of seed to be used in procing planting stock, and in general the practice has stified itself. Apparently the factors that make ssible vigorous vegetative growth likewise, in neral, enable a tree to produce adequate supplies of ed. Horticulturists have recognized, however, that avy seed production sometimes results from an overoduction of carbohydrates brought about by the thdrawal, from a tree making vigorous growth, of rt of the available supply of some essential nutrient ctor such as nitrates or water. The trees included in e Choctawhatchee experiments were handicapped, wever, by continuous partial starvation prior to 27. It can therefore be assumed that carbohydrates seed production were insufficiently available. Five ars' soil treatment was followed by cone production om 7 to 30 times as great as that on untreated plots. would appear that on poor sites such as the Chocwhatchee any factor that stimulates vegetative owth increases the fruitfulness of the tree.

❧

A 6-year-old slash pine tree 8 inches in diameter has en exhibited in Georgia as an example of the rapid owth of the species in that State. The tree was anted in a field with other slash pine seedlings in 26; the other pines have also developed well, but is tree holds the record.

United States to Receive Schlich Memorial Prize

Interest on a fund of £1,700 contributed by his friends to perpetuate the memory of Sir William Schlich has been awarded to the United States in 1932 by the trustees of the fund, according to notification received from J. S. Corbett, secretary of the Empire Forestry Association of London. The interest, £75, is paid each year in rotation to different parts of the British Empire and to the United States to be devoted to some purpose calculated to promote the cause of forestry. Disposal of the money has been placed in the hands of the executive council of the Society of American Foresters with authority to take such action as in its judgment will be most appropriate for the purpose intended.

William Schlich was born in Germany in 1840 and received his forestry training there at the University of Giessen. In 1867 he accepted a position in the Indian Forest Service. He held several successive posts in that service until in 1881 he was appointed Inspector General of Forests in India. In 1885 he went to England to inaugurate forestry work at Coopers Hill College, and 20 years later was called to Oxford University to organize a school of forestry there. In 1909 he was knighted for his services in India. At the time of his death, in 1925, he was still professor of forestry at Oxford. He is best known in this country for his 5-volume "Manual of Forestry," for many years the standard work on forestry in English.

Planting Tray for the 1-Man Crew

A receptacle in which the 1-man planting crew can conveniently carry his own supply of little trees is a galvanized iron tray designed by E. O. Ehrhart, forester for the Armstrong Forest Co., of northwestern Pennsylvania. The tray has a 10 by 15 inch base, 4-inch sides, and an upright handle of ¾-inch strap iron rising 12 inches above the base. To make the grip comfortable a ¾-inch galvanized iron pipe is stripped over the crossbar of the handle. A support that holds the trees in a semierect position has been provided by making one end of the tray slope outward at an angle of about 45°. This sloping end is of galvanized sheet steel. Joints are soldered and riveted.

❧

Trees recently found growing on the slopes of the Venezuelan Andes by a Carnegie Institution expedition belong to the same family as those which once flourished in California and Oregon, according to comparisons with fossil leaf prints found in rocks of the Pacific Coast region. The discovery fits in with the theory that the ancient forests of western North America were pushed south by increasing cold and dryness of the climate.

Foreign Notes

Southern Pines Promise Success in South Australia

Under an afforestation program begun in 1923, the Woods and Forests Department of South Australia had planted with conifers 31,401 acres of the 271,518 acres of State forest land at the end of 1930, according to the report of the conservator of forests of South Australia for 1930–31. *Pinus radiata* predominated among the species planted.

In the State tree nursery maintained by the department experiments are being made with exotic pine species with the following results:

With regard to the introduction of the conifers from the Southern States of the U. S. A., namely, *Pinus caribaea, palustris*, and *taeda*, this promises to allow of the utilisation of areas where it has not been found possible to grow *radiata*, particularly with reference to the swamp lands for *caribaea* and the deep sands for *palustris*, as, within the various tracts being afforested, there are large areas comprised of these two classes where even *pinaster* has not succeeded. It has been pleasing to note the exceptional growth of *Pinus caribaea* (slash pine) planted on both mound ploughing in swamps and on ploughed lines just off the swamp. Planted as seedlings some 6 to 8 inches high, they are now after 12 months' growth 18 to 36 inches high, with strong thick stems.

Pinus taeda and *Pinus palustris* are also flourishing and give every indication of complete success. Two new species—*Pinus luchuensis* and *Pinus insularis*—have been sown in the nurseries and are so far thriving well.

It has been observed that up to the present rabbits have avoided *Pinus caribaea*, even in areas where destruction has been heavy on other species of conifers.

Experiments in a small way are being conducted with *Pinus insularis*, which, during its nursery stage in open beds, looks promising.

The germination of locally collected seed of *Sequoia sempervirens* (California redwood) procured from fine healthy trees at the National Park, Belair, and the quality of the nursery stock, is most encouraging to its establishment in this State on suitable soil sites.

Advanced Pulping Methods Used in Swedish Mill

Methods of handling logs at Sweden's largest pulp mill, situated at Ostrand in northern Sweden, are in some respects unusual. A new type of barking drum and a novel drying machine are of particular interest. The largest sulphate mill in Europe, the Ostrand mill belongs to the Svenska Cellulosa Aktiebolaget (Swedish Pulp Company) which controls 5,100,000 acres of forest and agricultural lands in the north of Sweden.

The pulp logs are superficially barked in the forests to diminish risk of losses in transportation through sinking in the rivers. The inner bark is removed at mill by the new revolving drums, built for continu barking of logs in full length. A radical change in d ing methods has been introduced by the fan-dry machines. Instead of placing the pulp on the usual of cylinders for drying, it is dried by hot air in h cases with sides closed and insulated to prevent h losses.

The mill has a wood yard with an area of 150,(square yards and a capacity of over 4,000,000 lo The logs are stored in parallel piles in such a way as give free circulation of air to all parts. A crane a conveyor 1,000 feet long with three pairs of legs wheels driven by synchronized motors can be eas manipulated on tracks over the whole yard and hand logs in bundles up to 10 tons in weight.

Germany Accords First Place to Forestr in National Agricultural Celebration

In Germany's annual national agricultural expositio known as the Grune Woche, held in midwinter at Berli prominent place was given this year to a forestry exhib designed to bring to public attention the many uses wood in German life. The exhibit is described as ve effective by Joshua A. Cope, extension forester Cornell University, who spent the first half of 1932 Europe and attended the Grune Woche.

More than casual attention was attracted by t elaborate exhibits of commercial products of Germ forests, of the outstanding qualities of wood as ra material, for home building, and for furniture, and pictures and charts showing German forests and fore work and the economic status of wood in Germany the present time. The world economic depressio competition of foreign woods, and increasing use substitutes have forced down the price of Germ forest products to such a low figure that on the progra of the fair was the statement, "This is the zero ho of forestry in Germany."

❧

The oldest industrial company in Sweden, and pe haps in the world, is Bergslaget (Stora Kopparber Bergslags Aktiebalag), founded in the year 1225. started as a mining company, first producing wood f charcoal and mine timbers, later for lumber and pul For 700 years the company has been logging the sa forests, and to-day they are better than ever. million acres of forest land is under systematic silvicu tural management in charge of a forest staff who sele and mark the timber to be cut and superintend operations, including logging.

eague of Nations Calls Meeting of European Lumber Experts

A committee of European lumber experts, represent-
g Germany, France, Great Britain, Italy, Finland,
e Netherlands, Poland, Sweden, Czechoslovakia,
viet Russia, and Yugoslavia, has been appointed by
e League of Nations to examine the world lumber
uation and to recommend remedial measures, accord-
g to a report of the assistant United States trade
nmissioner at Paris. A 3-day meeting of the com-
ttee was held in Vienna in June. Data will be
lected by the committee on such matters as the
ganization of the lumber industry in the various
intries, lumber export figures and their relation to the
neral exports of each country, statistical facilities
ailable, and regulations governing imports and ex-
rts, such as quotas and customs duties. This in-
mation, the League hopes, will furnish the basis for
formation of a feasible plan for international co-
eration to improve the condition of the industry.

New Fire Pump Shows Promise in British Columbia Tests

Failing to find a stock fire pump for sale by manu-
turers in England or America embodying certain
ired specifications, the British Columbia Forest
vice ordered one built in Vancouver for experimental
rposes. The pump, as described by F. A. Mac-
nald in the June, 1932, Forestry Chronicle,[2] is of the
tage centrifugal type, to be operated with an Austin
gine weighing 135 pounds. Of aluminum alloy con-
uction with enclosed impellors, it weighs, with cou-
ng, 43 pounds, and is mounted with the engine on a
cially designed aluminum base.

Though not yet tested on actual fires, the pump has
n operated for about 25 hours and has made a per-
t record of performance. Working at 150 pounds
ssure at the pump, this equipment has in actual
ls thrown 78 measured gallons of water per minute
ough two one-half inch nozzles to a distance of 125
t.

Mr. MacDonald lists seven advantages of the pump
inst two disadvantages. The latter are that the
mp must be primed before starting the motor and a
od foot valve attached to suction hose, and that the
t weighs about 220 pounds. This weight, however,
y be offset by the pump's dependability. The good
nts are:

1. Engine is controlled by governor so that hose may
rst, couplings come off, or changes can be made from
e hose line to two or three, and the engine will not
e.

2. The engine can not be unduly speeded up or raced
the operator.

3. The only wearing points in the pump are double ball-bearings and packing glands, one each at either end of the pump shaft. The rotors are not in contact with the body of the pump and consequently no loss of efficiency will arise from this cause, so common in gear pumps.

4. The higher the pressure against which the pump is working the less work the engine has to do. Gear pumps become harder to drive as the pressure increases.

5. Engine is easily started against full head of water in hose, as rotors turn freely like a flywheel in the entrained water. Any person who has tried to start a gear pump against 100 or more pounds pressure will appreciate the advantage of this feature.

6. Hose may be kinked with no resulting damage to pump or engine.

7. Water has been delivered in a fair stream at a measured elevation of 360 feet at the end of 1,100 feet of hose. On this occasion 190 pounds pressure was shown at the pump.

Extent and Value of Japanese Forests

Forests and wild lands occupy approximately 60 per cent of Japan's total land area, and the total value of production from these lands amounts annually to about $120,000,000, according to the recently issued statistical abstract of the Japanese Ministry of Agriculture and Forestry for 1930. During 1930 the aggregate area of forests and wild lands was 56,890,000 acres, of which 86 per cent consisted of forested tracts and 14 per cent of bare tracts.

Encouragement by the Government, local authorities, and other public bodies was probably responsible for an increase over 1929 of 0.6 per cent in the area of protection forests, which was 5,085,000 acres in 1930.

During 1930, 250,090 acres of land were afforested; 334,900,000 trees were planted, two-thirds of which were Japanese varieties of cedar, cypress, and pine; and 879,689 acres of land were cleared. The total value of wood produced during the year was estimated at $60,000,000, of which 57.9 per cent was lumber, 39.4 per cent fuel and construction wood, and 2.7 per cent bamboo.

Miscellaneous products and nontimber crops from forest lands were valued at nearly $48,000,000, the most important products being charcoal, coal, green grasses, mushrooms, bamboo sprouts, and wasabi.

Since the World War, and particularly since the earthquake, Japan's wood production has tended to decrease, and lumber exporting has given way to lumber importing. Large quantities of Douglas fir are now imported annually from the United States.

* * *

In connection with the Bordeaux Pine Institute of Bordeaux University, a laboratory for the study of pines, their uses, diseases, and the extraction and utilization of their resinous products has been instituted in France. The laboratory is situated in the Hermitage forest, about 15 miles from Bordeaux.

Published by the Canadian Society of Forest Engineers, at Toronto.

Personals

Hugh P. Baker, dean of the New York State College of Forestry at Syracuse University, who lectured at Princeton as one of a group of public speakers known as the Guild of Brackett Lecturers, has been elected a Brackett member of the Princeton Engineering Association. Doctor Baker has also been selected by the New York State Historical Association to contribute a chapter on the history of forestry in the State to the 2-volume history of New York now being prepared by the association.

T. G. Woolford has been reelected president of the Georgia Forestry Association for the coming year. Other officers are G. Ogden Persons, first vice president; Jack Williams, second vice president; J. P. Campbell, third vice president; Joseph A. McCord, treasurer; Bonnell Stone, secretary; and C. B. Harman, chairman of the executive committee.

Ward Shepard, formerly of the United States Forest Service and now in Germany, has been selected to make a study of German forestry with particular reference to its application to conditions in America under a grant for this purpose made by the Oberlander Trust of the Carl Schurz Memorial Foundation, Philadelphia.

Officers elected by the Gulf States section of the Society of American Foresters for the coming year are F. B. Merrill, State forester of Mississippi, chairman; G. H. Lentz, of the Southern Forest Experiment Station, vice chairman; and A. R. Spillers, also of the experiment station, secretary.

James L. Averell, a 1926 graduate of the Yale School of Foresty, who resigned from the United States Forest Service last year to do graduate work as Baker fellow in forestry at the University of California, spent the summer as assistant at the university's summer camp in Plumas County, Calif. He will continue his studies toward the Ph. D. degree from California University during the coming year.

G. W. Hult, formerly with the United States Forest Service in region 6 and with the SouthernPacific Co. in California, has recently entered private forestry practice with headquarters at Corvallis, Oreg. Mr. Hult spent the year 1926 in Europe, making a study of European forestry methods; in 1929 he was at the University of California doing research work in the field of forest management and economics.

Fred Kennedy, junior range examiner, has been transferred from the Weiser National Forest, Idaho, to the Northern Rocky Mountain Forest and Range Experiment Station, where he will assist in handling the range research work being conducted at the United States Range Livestock Experiment Station near Miles City, Mont., in cooperation with the Bureau of Animal Industry.

The California State Board of Forestry has appoi district foresters to take charge of the four dist into which the State has been divided for forest pro tion purposes. W. H. Coupe is in general charge of protection in the State, under the direction of S Forester M. B. Pratt, with headquarters at Sacrame and also serves as district forester for the south California district. Other district foresters are: C. Strickland, northern California district, Red Bluff; O Fowler, central California district, Sacramento; Frank E. Thompson, central coast district, Palo A

E. V. Roberts, who was in charge of the progra reforestation in the Virgin Islands which was disc tinued by the United States Forest Service July 1, been assigned to the Forest Survey with headquart at Washington.

Hugo L. Sundling has been transferred from California Forest Experiment Station to an admi trative position in region 3 of the Forest Service.

E. L. Hamilton, who has been in charge of Standard Lumber Co. timber sale on the Sitgrea National Forest, Ariz., has transferred to the Califor Forest Experiment Station.

William D. Miller, who spent the month of June the Connecticut Agricultural Experiment Station, be instructor in silviculture at the University of Ida during the coming school year.

F. H. Sipe has been transferred from the Dry Ri ranger district on the Shenandoah (now Geo Washington) National Forest to the Damascus ran district on the Unaka Forest, with headquarters Damascus, Va.

William C. Bramble, who has done graduate work forestry at Yale University and was awarded a natio research fellowship, has accepted a position as structor in plant physiology at Carleton Colle Northfield, Minn.

W. S. Price, chief lumberman on the Plumas Natio Forest, Calif., has been appointed to the staff of t regional forester of the California region, to ta charge of the timber-sale work formerly handled J. C. Elliott.

Henry I. Baldwin, formerly with the Brown C Berlin, N. H., has been in charge of the junior divisi of Camp Riverton, Long Lake, N. Y., during the su mer. He gave a course in forestry at the camp.

R. R. Chaffee has recently become eastern manag of the California Redwood Association with hea quarters in New York City.

Honorary degrees were received this spring by the lowing members of the United States Forest Service: M. Granger, director of the Forest Survey, degree doctor of forestry from Michigan State College; N. Wheeler, lecturer of the division of State coopera- n, doctor of science from Milton College, Milton, s.; John D. Guthrie, assistant regional forester of ion 6, master of science from Union College, henectady, N. Y.; R. D. Forbes, director of the egheny Forest Experiment Station, master of arts m Williams College.

B. F. Jones, of the Great Northern Paper Co., Ray- nd E. Rendall, of Bates College, and Austin Cary d C. R. Tillotson, of the United States Forest vice, have been asked by Forest Commissioner lette, of Maine, to serve on an advisory com- ttee for Indian Township, a State-owned area near nceton in eastern Maine that is to be put under est management.

Clyde Leavitt, for many years engaged in railway fire prevention work with the Board of Railway Commissioners of Canada, has accepted a special assignment to the research division of the New York State College of Forestry at Syracuse University, according to the Canadian Forestry Chronicle.

William G. McGinnies, professor of range ecology at the University of Arizona, formerly of the Forest Service, received the degree of doctor of philosophy in plant ecology from the University of Chicago this spring.

S. R. Black, secretary of the California Forest Protective Association, has been named by the Governor of California as a member of the State board of forestry, succeeding Edwin Mueller, resigned. Mr. Black took a prominent part in the organization of the forestry camps for unemployed men maintained by the State last winter.

Bibliography

Strength-Moisture Relations of Wood

J. B. ALEXANDER, Forest Products Laboratories, Canadian Forest Service

The long-standing demand for more accurate and haustive information regarding the comparative ength of wood at varying degrees of moisture con- t has been met by a recent publication of the United ates Forest Products Laboratory.[3]

In the introductory pages of this bulletin, a brief cussion is given on the occurrence of moisture in liv- trees; equilibrium moisture content; how moisture associated with wood structure; and fiber-saturation int. Early investigations of the moisture-strength ation and the "straight-line" formulae derived there- m are reviewed. The limitations of the straight-line mulae are indicated and from this point onward the cussion concerns the "exponential" formula only. The tests, on the results of which this report has been pared, have been divided into two groups: (1) Those ported in Forest Service Circular 108, The Strength Wood as Influenced by Moisture, and in Forest vice Bulletin 70, Effect of Moisture upon the ength and Stiffness of Wood; (2) those made spe- cally for this investigation.

The selection, seasoning, and size of test pieces of oup 1, together with the various mechanical tests, described and the species investigated are named. charts follow, showing the logarithm of the strength ction plotted against the corresponding moisture nstant. Following the charts are tables showing ta used in their construction.

As is to be expected, data used for Group 2 are much more complete and interesting than for Group 1. Trees were specially cut for this project—Sitka spruce and Douglas fir from Washington; yellow birch and white ash from Wisconsin. Logs were taken at varying heights from the stump. The careful matching, drying, and testing of the specimens are described, and 12 charts follow, showing the logarithm of several physical and mechanical properties plotted against the corresponding moisture content, together with the test data for each chart.

Moisture per cent at fiber-saturation point has been discarded and the moisture per cent at the intersection of the two arms of the strength-moisture curve has been emphasized. This moisture per cent, designated as M_p, was determined from experimental data by a least-square computation. Inasmuch as there are great variations in the strength values of seemingly identical test specimens, it seems questionable whether the laborious and refined calculations essential to the application of the method of least-squares to so large a number of tests is wholly warranted, as the M_p is given to the nearest per cent only. A percentage scale, showing the percentage deviation of any plotted point from the line drawn to average the series of points to which it belongs (which is shown on the charts), gives the reader a clear conception of the variation to be expected above or below the average for a given strength function. As M_p varies with species, the bulletin very pertinently points out that an accurate adjustment of test values requires accurate values for M_p, and that some method by which M_p can be found without exhaustive mechanical tests is very desirable. Various methods of determining and estimating M_p and charts

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Wilson, T. R. C.: Strength-Moisture Relations for Wood. U. S. t. Agr. Tech. Bul. 282, 88 pp., illus. 1932.

for its determination by shrinkage from green to oven-dry condition for the four species of Group 2 are shown.

A number of examples are worked out in detail to illustrate the use of the exponential formula for adjusting strength-moisture relations. Following these is a discussion of the effect of errors in estimating the values of *K* (the slope of the strength-moisture curve) and M_p. Obviously a knowledge of the effect of errors on these two factors is essential to the intelligent application of the formula in order to permit the computer to properly appraise the adjusted value.

It should be carefully noted that strength-moisture adjustments can be made, with any expectation of accuracy, only on small, clear specimens having uniform, or nearly uniform, moisture distribution. No such adjustment is possible for pieces of structural size with nonuniform moisture distribution and defects (natural or of manufacture), as the bulletin very clearly points out.

This bulletin has evidently been written for technical men, and to such it brings a wealth of information on a subject on which, up to this time, comparatively little has been known and still less printed and made available. The nontechnical public will find it hard to read.

Properties and Uses of Western Larch

By S. V. Fullaway, Jr., Western Pine Association

In publishing Technical Bulletin 285, entitled "Properties of Western Larch and Their Relation to Uses of the Wood," the Forest Service has added a worthy booklet to its series on important tree species; for larch, though its lumber has never been widely distributed, should be considered as important since it grows in abundance in the inland forests of the Pacific Northwest, particularly in western Montana and northern Idaho, and is a wood which possesses many valuable properties. This booklet as prepared by R. P. A. Johnson and M. I. Bradner deals with the subject in a comprehensive manner, starting with a discussion of the character of the larch forest, marketing practices, and mechanical and physical properties of the wood, and following with information about the grades of larch lumber and the many uses to which it is put. Tables, graphs, and illustrations amplify the descriptive matter.

It is unfortunate, of course, that the adoption of the term "ponderosa pine" by the Forest Service in place of the name "western yellow pine" occurred too near the date of issuance of the larch booklet to permit the correction of references to this wood in the several charts and in the descriptive matter.

The bulletin shows careful preparation and in general the fairness and accuracy of the statements can not be questioned. Probably the weakest part and the one most likely to draw fire from lumbermen who are primarily interested from the standpoint of manufacture and sale of the wood is the cataloguing of defects and the attempt to put them on a percentage basis each grade of larch. It indicates a negative rat than a positive approach which is unsound as a mar ing principle. It attempts to average something wh does not lend itself to averaging methods, and wo have been better handled if piece descriptions had b given. Its accuracy as applied to the general ru larch lumber is questionable.

The discussion on the use of larch for shipping c tainers, plywood, and paper might well have b reduced to a few sentences. On the other hand, th is much to be said for the bulletin, and on the wh it will serve a useful purpose in behalf of larch, a w of many uses.

New Manual Describes Forest Inse

A Field Book of Destructive Forest Insects, H. B. Peirson, State Entomologist of Maine, conta ing descriptions and illustrations of 22 of the m common forest insect enemies in the State, has recen been issued by the Maine Forest Service in cooperat with the Kennebec Valley Protective Associati R. E. Rendall, manager of the Bates Forest, Ba College, Me., says of the manual, "I have found it be of value in the field. It is well arranged and v usable. * * * Mr. Peirson has been very act in trying to perfect methods for combating destruct forest insects, particularly those attacking white pi spruce, and white birch. This contribution is indi tive of his thoroughness."

Measures for control of attacks on both forest a shade trees are outlined in the booklet and formu for spray dilutions given.

Anyone interested can obtain a copy of the man from the Maine Forest Service at Augusta, Me.

Growth Study of Underplantings in Ne York State

By L. S. Gross, United States Forest Service

An interesting addition to planting literature Bulletin No. 3 of the Black Rock Forest, A Study Several Coniferous Underplantings in the Up Hudson Highlands, by Henry H. Tryon. Twen seven planted areas were examined for the purpose securing data for this publication. In addition such native conifers as white pine, American larch, a balsam fir, the species in the plantations studied i cluded exotics such as Norway spruce and Scot pine, and American species not native to the regi such as Norway pine, silver fir, Sitka spruce, a Douglas fir.

The author shows very strikingly the utter futili of planting different species under a hardwood co without benefit of subsequent release cuttings. conclusions are brief and to the point. They are:

Since the factors of age of stock, soil quality, site, ecipitation, and care in planting were about equal in cases, it is evident that the height growth of conifous underplantings of the species listed herein is in ect inverse ratio to the amount of overhead shade, ipled with the soil conditions and root competition olved thereby.

Even after 15 years of suppression under a heavy rdwood overstory, Norway spruce displayed a orous response to release cuttings, following which t little mortality occurred in this species.

Insect damage by the spruce gall louse is confined efly to spruce plantations which have been grown der heavy shade.

Coniferous underplantings of the species discussed this study can not, in the Hudson Highlands, be cessfully brought to maturity without subsequent tural treatment which will in due time admit ficient sunlight to the plantation.

The bulletin is well illustrated with reproductions excellent photographs showing the development of nted conifers under hardwood shade as compared h the development of the same species in locations subject to the influence of the hardwood overstory.

Study of European Larch in the United States

By E. E. Carter, United States Forest Service

Only a few species of trees have given satisfaction en planted for timber production far outside their ural ranges. One that has been so used with fair cess is European larch. A recent bulletin by S. S. nt[4] summarizes the available information about the ntations of this tree in the northeastern United tes.

European larch does not reproduce well outside of rather limited natural range, but it has been widely l successfully planted in Europe, notably in Scotd and Scandinavia. Plantings in the United States e been fairly successful as far west as Iowa. Source seed is important, and Mr. Hunt warns against d from the Tyrol, recommending the use of either sian seed or that from the strain which has been wn so successfully in Scotland and from which the er Swedish plantations were started. Later use in eden of Tyrolean seed gave distinctly inferior ults. Most plantations in the United States seem have come from the thinner-barked, straighter, re frost-resistant Scotch strain.

The bad effects of close spacing and the necessity thinning early and repeatedly are emphasized in bulletin. This tree must have light; the uselesss of planting so intolerant a species under even the htest shade is brought out. Planting in pure nds is not recommended because of the danger of pests, but the author is encouraging concerning the larch sawfly and the European larch canker. The liability of damage by porcupines is mentioned. The rapid early growth of the species is discussed and illustrated, and a yield table, in cubic feet, bark included, for northeastern plantations up to 60 years of age is given, indicating mean annual growths of 67 to 93 cubic feet per acre per annum.

Fall planting is recommended because of the early starting of growth in the spring; "if a frost occurs soon after planting [in the spring], the trees are in poor condition to recover." In fact, frost damage is mentioned repeatedly, with the statement that in the tree's natural range late frosts are unusual. The recommendation for 1–2 stock will come as a surprise to some who have worked with the species. The tendency for very uneven development in first-year seed beds is not mentioned.

The durability of the heartwood and its resistance to penetration by preservatives, contrary to the ready penetration of the sapwood, are the chief points discussed in connection with properties and uses. In Europe the wood is in demand for ties, posts, and poles. Mr. Hunt reports it to be the favored wood for powerline poles in Sweden.

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[5] Prices of these bulletins will be furnished by the Superintenden Documents, Washington, D. C., on request.

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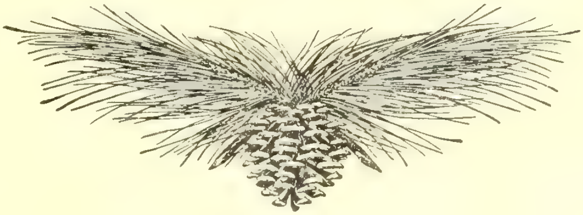
FOREST WORKER



November, 1932

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Announcements

National Research Council Offers Fellowships for 1933–34

Fellowships in the biological sciences, including forestry, are again offered by the National Research Council to qualifying citizens of the United States and Canada for study and research in America or abroad. The purpose of these fellowships is the promotion of fundamental research through the development of an increasing number of thoroughly trained investigators. Appointment is restricted to those applicants in the early stages of a research career who possess a Ph. D. degree or its equivalent, have demonstrated a high order of ability, and give promise of developing individual judgments and viewpoints in investigative work. The choice of place to work is left with the fellow, subject to the approval of the fellowship board of the council. Appointments are for full time for one year but are subject to renewal. The basic stipends awarded per annum are $1,620 for unmarried fellows and $2,070 for married fellows in America, or $1,620 and $2,160, respectively, with additional travel allowance, for unmarried and married fellows appointed to study in Europe.

Applications for fellowships for 1933–34 must be in the hands of the fellowship board not later than March 1, 1933. Appointments will be made about the 1st o May. Requests for further information should b addressed to the Chairman, Board of National Research Fellowships in the Biological Sciences, Nationa Research Council, Washington, D. C.

Sessions of Interest to Foresters at Meeting of A. A. A. S. in December

A session devoted to the physiology of forest trees is scheduled to be held by the American Society of Plant Physiologists in connection with the meetings of the American Association for the Advancement of Science at Atlantic City, N. J., December 27–31, 1932. All interested members of the Society of American Foresters and the Ecological Society of America are invited to participate in this joint session, which is to take place on the afternoon of December 30.

Also of interest to foresters at this meeting is the symposium to be conducted by the Ecological Society on the morning of December 30. The subject is "Some Aspects of Forest Succession," and such factors as humus, moisture, light, and fire will be considered.

The Forest Worker is published by the Forest Service, United States Department of Agriculture, Washington, D. C. Julia H. Drown, acting editor. Material offered for publication in the Forest Worker should be addressed to the editor.

Because the free edition is necessarily limited, this periodical can be distributed without charge outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

FOREST WORKER

Washington, D. C. NOVEMBER, 1932 Vol. 8, No. 6

State Forestry

Indiana Establishes Two New Forest Nurseries

Two new forest-tree nurseries have been established by the division of forestry of the Indiana Department of Conservation during the past summer. Both are so located as to spread employment to new localities in the State and to reduce shipping costs of trees distributed for forest plantings.

A nursery of 10 acres with a capacity of a million and a half forest transplants a year has been established at Shakamak State Park, near Jasonville, in southwestern Indiana. This nursery is operated jointly with the division of lands and waters of the department of conservation and will supply stock for both park and forest plantings. A comprehensive planting plan is being followed at Shakamak Park, where approximately 460 acres of old fields are being reforested over a period of four years by the division of lands and waters. Since the park is located in the territory where coal-mining operations are turning several hundred acres of soil upside down, it will be the policy of the forestry division to use the Shakamak nursery chiefly as a source of transplant stock for planting these stripped coal spoil banks. Coal operators in Indiana are planting a million trees a year on this type of land under a working plan that has been in operation for the past four years. In spite of extremely difficult planting conditions, it has been found that large transplant stock of white, red, Scotch, and Jack pines can be established successfully on these lands and that black locust makes phenomenal growth. The Shakamak nursery will also provide special stock for planting on all of the 10 State parks operated by the division of lands and waters.

At Brownstown, Ind., a transplant nursery with a capacity of a million trees a year has been developed in conjunction with the Jackson County State Forest, purchased during the past year. This nursery will be devoted to the production of transplants for general forest planting.

The major forest nursery in Indiana, located at the Clark County State Forest at Henryville, comprises approximately 28 acres under irrigation and intensive cultivation. The nursery contains 15,000,000 seedlings and transplants and has a capacity of 3,000,000 transplants a year in addition to seedling stock for supplying the other nurseries.

According to State Forester R. F. Wilcox, the estimated annual distribution of forest planting stock in Indiana will probably be close to 5,000,000 transplants per year. Trees are sold for one-half cent to 1 cent each to make the nursery self-supporting.

State Forests Donated to Rhode Island and Connecticut

Two areas to be used as State forests have been donated by the Wickaboxet Farms (Inc.), of Rhode Island—one, of 270 acres, to Rhode Island and the other, of about 250 acres, to Connecticut. A. Studley Hart, on behalf of the Wickaboxet Farms, presented deeds to the tracts at a formal ceremony held in connection with a meeting of the Rhode Island Forestry Association and attended by Norman S. Case, Governor of Rhode Island; Harry R. Lewis, Rhode Island Commissioner of Agriculture; Raymond G. Bressler, president of Rhode Island State College; Austin F. Hawes, State forester of Connecticut; and other State and forestry officials.

In accepting the area in West Greenwich which will constitute Rhode Island's second State forest, Commissioner Lewis expressed the hope that other gifts of land will be made to the State so that every section may have an area for demonstration of forestry possibilities and practices. The deed of gift of the new forest, which has been named the Wickaboxet State Forest, included the following conditions and recommendations: That management and supervision shall be under a trained forester, a graduate of a good forestry school with at least two years' technical experience; that the State commissioners of birds shall have the use of the forest for breeding wild fowl and animal life; that the forest shall be open to the use of the Rhode Island State College and Brown University in connection with courses in forestry, to the Boy Scouts for educational purposes, and to the United States Department of Agriculture for experiments looking to the restoration of chestnut trees in Rhode Island; and that the town of West Greenwich shall be compensated for the loss of taxable property by being permitted to obtain from the forest, for the cost of labor only, such wood as may be needed by its schools.

The tract accepted for Connecticut by State Forester Hawes is in the town of Voluntown and will be added to the Pachaug State Forest, bringing its total area to 9,253 acres. The new portion will be known as the Wickaboxet Block and will be under the direction of Ranger Gordon Abbott.

Abundant Seed Crop Gathered in the Adirondacks

Pine and spruce trees in the Adirondack Mountains produced extraordinarily abundant crops of cones this year. Many needy families in the region have earned money gathering the cones and selling them to the New York Conservation Department, which needed an unusually large number of forest-tree seed for its reforestation program. At its seed station at Willsboro, N. Y., the department is paying 50 cents a bushel for white pine cones and $1.75 a bushel for red pine and spruce cones, which are more difficult to gather. The fund of $20,000 which was set aside for the purchase of seed has already been almost entirely expended and the department has been supplied with enough seed to last for about three years. The seed house at the station is overcrowded and cones are heaped on tarpaulins on the ground. After they are dried and heated at the seed house the seed are shaken from the cones and stored in huge glass jars.

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Unemployment camps to be maintained by California within and adjacent to the national forests of the State will probably be allotted $300,000 this year out of State gas-tax money. A total of $700,000 will probably be devoted to this work by the State in 1932–33 as compared with $100,000 spent on the project last winter. The governor's committee on unemployment camps expects the work to be started earlier this fall and to run later into the spring. The camps are managed by the State board of forestry with the cooperation of national forest officers.

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Pennsylvania forest-tree nurseries contained 37,000,000 trees on September 1, 1932. Nearly 10,000,000 trees, 10 per cent of which are transplants, are available for shipment this fall and next spring. The species are red, white, pitch, and Scotch pines, Norway spruce, larch, black locust, black walnut, yellow poplar, and white ash. More than 27,000,000 trees growing in the State's four nurseries will be available for reforestation purposes in Pennsylvania in 1934 and 1935.

Small Landowners in Georgia Organize for Fire Protection

A new type of fire-fighting unit has been inaugurated in Georgia through a plan developed by the forestry division of the State department of forestry and geological development. The organizations, to be known as the "Forest Fire Fighters," will provide for the fire protection needs of landowners whose forest holdings are too small to come into the 10,000-acre minimum unit of the timber protective organizations. They will foster cooperation among small owners, provide leadership in fire fighting, and establish local responsibility for fire control.

The first unit of this type of organization has been formed in the vicinity of Commerce, in Jackson County, by C. L. Veatch, agricultural vocational teacher, who was active in the development of the plan. Reports received by State Forester B. M. Lufburrow indicate that a number of other communities are ready to organize on the same principle. District foresters in charge of the work of organization and supervision are assisted by special patrolmen and by vocational agricultural teachers.

The landowner joining a Forest Fire Fighters unit signs an individual contract, and the organization enters into a cooperative agreement with the State forest service. The landowner agrees to make a sincere effort to keep fires permanently out of his timberland; to employ methods of fire protection recommended by the State division of forestry; to aid other members of the organization, when called upon, to fight fires on their lands or fires that threaten members' lands; and to report fires on his land and the expense of controlling them. The State division of forestry agrees, on its part, to demonstrate methods of fire prevention and control, supervise fire fighting whenever possible, advise as to forest management, and to refund 50 per cent of the costs of fire-fighting equipment purchased by pooled funds of the organization, title to which will be in the State.

Maryland Fire Tower has Unusual Features

A new 120-foot steel fire tower recently erected in Dorchester County, Md., about 2 miles south of Church Creek, was constructed from a design which retains a uniform taper from the base to the floor of the cab, an unusual feature in a tower of this height.

There are no hills in southwestern Dorchester County, and the site chosen for the tower being at an elevation of only 4 feet it was necessary to sink the concrete abutments approximately 2 feet below sea level. This is believed to be the first forest-fire tower to have foundations extending below sea level.

Black Walnut Seed Distributed for Planting in Indiana

In the past two planting seasons 2,323,000 black walnut seed have been distributed to tree planters in Indiana. Starting originally in 1927 in cooperation with Frank S. Betz, internationally known tree planter, the distribution of tested, stratified walnuts by the division of forestry of the Indiana Department of Conservation to planters in the State has averaged more than a million walnuts a year for the last three years. The walnuts have been planted by farmers, business men, school children, nature-study clubs, sportsmen's organizations, and the American Legion. A large number have been used in reforestation work on the State forests, game preserves, and parks. In the spring of 1932 more than half a million black walnut seed were planted on the Morgan-Monroe Counties State Forest alone in an effort to reestablish this valuable species in the composition of the stand.

The large quantities of nuts purchased by the division of forestry for this distribution have been obtained through the help of county agricultural agents, who have encouraged collection of walnuts in their counties as an added source of revenue to local farms. The 4-H club boys and girls and labor otherwise unemployed were available to aid in the collecting.

The nuts are gathered in the fall, hulled, and tested n water to eliminate those which show by floating that they are not viable. They are hauled by truck to the State nursery in Clark County, where they are stratified in bins, some of which are as large as box cars. In the early spring the sand and nuts are shoveled over a screen and separated. The walnuts are packed in strong burlap sacks with wet moss to keep them from drying out during shipping. If the germination period of the walnuts is watched carefully, they can be distributed and planted before they start to crack open and without injury to the sprouting embryos.

It has been found that the seed of black walnut are much more satisfactory for planting than 1-year walnut seedlings grown in nursery beds, and they can be transported and planted more cheaply. The establishment of walnut trees the first year from the nuts has averaged from 50 to 60 per cent of the number planted. Delayed germination usually adds another 10 to 20 per cent the following year. In experimental plantings where nuts and trees were used side by side it was demonstrated after two years that the trees coming from the nuts were much more vigorous and more satisfactory in every way.

Planting black walnut seed is easy. The top of a bran sack half filled with nuts can be rolled down and a string tied to two corners and thrown over the planter's shoulder. Swinging a light grub hoe with one hand and using the other to take walnuts from the sack, a workman can plant the nuts almost as fast as a man would ordinarily walk.

Squirrels and other rodents always take their share of the planted nuts, and experiments are being conducted this year with light creosote and oil treatments to determine the proper solution to make the seed unpalatable to the rodents and yet not interfere with successful germination.

Nurseries and Planting in Puerto Rico

By William R. Barbour, Insular Forester, Puerto Rico

Methods of nursery and planting technic used in Puerto Rico differ greatly from those in temperate regions. Forest administration in the island is also somewhat unusual because of the fact that the insular forester is at the same time supervisor of the Luquillo National Forest. Under these circumstances a very close coordination naturally exists between the insular and Federal services. The Puerto Rican forest nurseries have so far furnished all stock for planting on the national forest, partly free of charge and partly at cost.

There are three insular nurseries in Puerto Rico, the main one at Rio Piedras, supervised by a technical planting specialist, and two subnurseries at the western end of the island, operated respectively by a forest inspector and a forest guard, both of them trained at the Rio Piedras nursery. These three nurseries have a combined annual production of about 2,000,000 young trees, most of which are 4 to 6 month seedlings, the rest being transplants. More than 200 species of trees, both native and exotic, have been tried out in these nurseries. Tree seed obtained from all regions of the world, tropical, subtropical, and even temperate, have been planted. Many have proved to be unsuitable, so that the principal production of the nurseries has gradually been curtailed to a dozen or so species, though many other kinds are still grown on a small scale. During the past fiscal year, for example, there were distributed 124 species of seedlings, of which the first 12 constituted nearly 95 per cent of the total number. These 12 included *Casuarina equisetifolia* (Australian), *Cedrela odorata* (native Spanish cedar), *Samanea saman* (South American), *Cassia siamea* (East Indian), *Swietenia mahogani* (West Indian mahogany), Eucalyptus (Australian), and 6 other species about equally divided between native and exotic.

The Rio Piedras nursery is equipped with 350 concrete-walled seed beds, each 4 by 25 feet. The soil in them is elevated a foot above the intervening paths chiefly to prevent the depredations of insects, notably the "changa" or mole cricket. The fertility of the soil is maintained by the use of compost, green-cover crops (especially Canavalia beans), and more recently a 9–9–9 commercial fertilizer which has given excellent results, speeding up the growth of the seedlings by at least 25 per cent. Generally speaking, species grown in the concrete beds are those of moderate delicacy, which must be given partial shade until germination. From 6 to 16 ounces of seed are sown broadcast per bed, covered with a thin layer of river sand, and shaded by lath-and-wire woven screens in rolls 4 feet wide and the length of the bed. Damping off is held in check by occasional fumigation of the soil with formalin and light applications of Bordeaux mixture. If, as sometimes happens, ants become too numerous, they are controlled by the use of powdered cyanogas. The yield of seedlings per bed is from 1,000 to 5,000, depending on species. Seedlings are lifted when 12 to 18 inches tall, suppressed individuals being transplanted and held for an additional two months or more before shipment.

Seed of the Leguminosae and of other families which are not delicate are sown broadcast in temporary beds, covered with sand, and given no special attention. The most delicate types, especially Eucalyptus, whose seed are almost as fine as grains of pepper, are sown in shallow flats and started in a greenhouse, being pricked out in transplant beds when a few inches high. Species imported in small quantities for experiment are also started in the greenhouse.

As most tropical tree seed soon lose their viability, no attempt is made to store them for long periods. Tin milk cans with tight-fitting lids give better results as storage receptacles than loose sacks. Germination tests, both in dishes and in soil, are run at frequent intervals. Usually the percentage holds up well for some months and then suddenly drops almost to zero. To insure that seed collectors and dealers outside of Puerto Rico furnish proper seed, a collection is maintained of almost 200 bottles of authentic samples of seed, with which shipments can be compared. This collection of seed of tropical species, already probably one of the most complete in the world, is constantly being increased.

Seedlings to be shipped are lifted from the beds by the use of spades, sorted and counted, and their roots packed in wet sphagnum moss and covered with burlap. From 100 to 1,000 constitute a package, which is shipped by either parcel post or express. Neither roots nor tops are pruned. The seedlings will remain in good condition in the bundles for several days. A careful record is kept of all shipments. The trees are listed by species, municipalities, recipients (governmental departments, individuals, etc.), and destined use (timber production, windbreaks, coffee shade, or ornamental). So far as possible, shipments are later followed up by the Puerto Rican extension forester.

Nearly all planting in Puerto Rico is by the hole method, using hand labor exclusively. The only exception is in the case of seedlings on special order which are transplanted in the nursery into tar-paper cylinders, and finally planted pot and all. This method will give high percentages of survival under even the most adverse climatic conditions. Seedlings in bundles are given away, but a charge of 4 cents apiece is made for potted trees. A charge of $6 per thousand is made for seedlings shipped outside of Puerto Rico, as, for example, to the neighboring Republic of Santo Domingo.

Planting costs vary tremendously, depending on th accessibility and condition of the site. On a basis a spacing of 8 by 8 feet (675 trees per acre) the averag planting cost is about $5 per acre, or about $9 pe acre including the cost of growing the seedling which averages close to $6 per thousand. Two subsequent cleanings at 6-month intervals bring the tota cost to about $12 per acre.

The Puerto Rican Forest Service has planted abou 1,000 acres on its insular forest reserves, partly by th use of seedlings and partly by direct seeding wit certain large-seeded species. Some of these plantation are now 10 years old.

The United States Forest Service made its firs experimental plantings on the Luquillo National Fores last year. About 40 acres have been planted, usin nine species in various mixtures. Most of these plot promise to give excellent results.

Rates of growth in Puerto Rico are much higher tha in temperate regions. A plantation of Casuarina o very poor soil, for example, spaced 8 by 8 feet, at 1 years of age averages 57 feet in height and 6.1 inche in diameter breast high, yielding more than 32 cords o firewood, or 4,200 fence posts, per acre. Mahogan and Spanish cedar trees 25 years old are more than 2 inches in diameter breast high, with a usable length o two 16-foot logs. There is probably no place in th world where artificial reforestation will yield greate financial returns than in Puerto Rico.

Though the production of the Puerto Rican fores nurseries has expanded steadily for more than 10 years at no time has it caught up with the demand. I funds to produce 3,000,000 seedlings a year were available, that number could easily be disposed of At a conservative estimate, there are in the island over half a million acres of denuded land not now used for agriculture. Much of it is on the higher mountain slopes. Reforestation of these lands would not only have a marked effect on climate and stream flow, but would in a comparatively short term of years yield substantial financial returns.

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Allotments of Federal funds to States for cooperative growing and distribution of forest planting stock to farmers under the Clarke-McNary Act amount to $71,968 for the fiscal year 1933. Funds for administration and for possible allotment to new States bring the total to $79,960. For 1932 the fund amounted to $95,000. An increase in the total amount of State funds will offset the decreased Federal allotments, however. The 1933 total of cooperative State and Federal funds combined is placed at $285,197.44, as against $275,206.15 for the fiscal year 1932. Thirty-eight States and the Territories of Hawaii and Puerto Rico cooperate with the Federal Government in this work.

Hybrid Larch Making Good Growth in Ohio

Several thousand seedlings of a new hybrid larch known as the Dunkeld larch (*Larix eurolepis*) are making unusually rapid growth in the Ohio State nursery and are being watched with great interest. The seed from which they have been raised were obtained by the Ohio Forestry Department two years ago from Scotland, where the tree grows several feet in height a year after becoming established. It promises to become one of the important larches in that country.

The hybrid resulted from cross-fertilization of the European larch (*Larix europea*) and the Japanese larch (*L. leptolepis*), at Dunkeld, Scotland. The supply of viable seed produced by the mature trees is limited and general distribution outside of Scotland has been avoided.

The Year's Accomplishments in Hawaiian Forestry

Changes made in the forest reserve system of Hawaii during the fiscal year ended June 30, 1932, resulted in the net addition of 5,950 acres, according to the report of Territorial Forester C. S. Judd. The total area of land in the 64 forest reserves on the five main islands is now 1,027,264 acres, of which 65 per cent is owned by the Territory.

The work of protecting this vast forest estate, which is devoted mainly to the conservation of water, was advanced during the year by the construction of 14.10 miles and repair of 14.10 miles of fences on forest reserve boundaries, the planting of 323,111 trees on open places on Government lands in the reserves, and the removal of 7,947 destructive wild goats, 5,060 wild pigs, 2,193 sheep, 66 cattle, 13 asses, and 6 wild horses.

The four tree nurseries of the division of forestry distributed a total of 871,486 plants during the year. Of these, 398,713 consisted of trees given out to farmers under section 4 of the Clarke-McNary Law.

The George Washington Memorial Grove of 2,000 coconut trees at the Mokapu game farm, on Oahu, was dedicated with appropriate ceremonies on February 20, 1932. Preparations for the establishment of a grove of over 1,000 sandalwood trees to be planted out this fall on a ridge near Honolulu have been made by the setting out of 3,000 trees to serve as hosts, sandalwood being a root parasite.

A reclamation project on the eroded ridge back of Fort Shafter, carried on in cooperation with the United States Army, was completed in March by the planting of about 20,000 trees on the shifting soil.

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Experiments have proved the practicability of growing carpet grass on plowed firebreaks in Florida, says State Forester Harry Lee Baker. A good stand now exists on a line 40 feet wide and 2 miles long on the property of the Loncala Phosphate Co. near Clark, just south of High Springs, Fla. The Florida Forest Service is conducting experimental work on the same area with centipede grass to determine its suitability for planting on high, dry sites where the carpet grass, which prefers low, damp locations, will not thrive.

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A State fish and game department has been organized by Mississippi and a fish and game commission appointed which includes Edward McIntyre, chairman, W. G. McGill, and Ben M. Stephens. Hunter Kimball was named director of the new department. Mississippi is the forty-eighth State to organize such a department and commission.

Education and Extension

New York State College Acquires a Wild Life Station

A gift of a forest in the Adirondack Mountains, embracing 14 parcels of land and lakes aggregating more than 13,000 acres, has been accepted by the trustees of Syracuse University for the New York State College of Forestry. Donated by Archer M. Huntington and his wife, Anna Hyatt Huntington, of New York City, the forest will be known as the Archer and Anna Huntington Wild Life Forest Station.

The area is located principally in Essex County, in townships 27 and 28 and the town of Newcomb, and is accessible from the Newcomb-Long Lake highway near Rich Lake. It contains two large and numerous small lakes, streams, marshland, wooded slopes, and two mountains of more than 2,500 feet in height, and is exceedingly rich in the flora and fauna of the eastern Adirondacks.

The land will be used for experiment and research in relation to the habits, life histories, methods of propagation and management of fish, birds, and game and fur-bearing animals by the Roosevelt Wild Life Station at the College of Forestry and also by the college directly in the promotion of forestry as an aid to game management. "Under the direction of the college and through the Roosevelt Wild Life Station it should be possible to take this miniature of the Adirondacks as a whole and make it gradually a reservoir of information as to the most scientific and most practical means of making our forest areas give the maximum of usefulness," said Dean Hugh P. Baker, of the college. "In carrying out the purposes of the donors it should be possible to demonstrate that both the wild life and the forest in all of its phases can be kept in balance, producing increasing values in the way of wild life, recreation, and direct forest products."

Both Mr. and Mrs. Huntington have long been interested in wild life. Mrs. Huntington, who is internationally known as a sculptor, did her earliest and some of her most noted work in this field.

Four-H Clubs of Louisiana Parish Receive Gift of Forest Lands

To provide a place for practical forestry instruction, demonstration of the possibilities of forestry, and as the basis of an endowment fund for the education of 4-H club members, H. C. Thompson, of Oaklawn, St. Tammany Parish, La., has donated two tracts of forest land to the 4-H clubs of his parish. Mr. Thompson, who has done reforestation work on his lands with seedlings obtained from the Louisiana State nursery, became interested in the forestry work of the 4-H clubs as a result of the forestry program of Extension Forester Robert Moore and County Agricultural Agent O. G. Price.

St. Tammany Parish is in the extreme southeastern portion of Louisiana, bordering on Lake Pontchartrain. Most of the magnificent stands of longleaf pine which once grew there have been cut for many years, and the last of the virgin timber is now being removed. Though practically at the western limit of the slash pine belt, it contains good second-growth stands of slash pine.

One of the donated tracts comprises 170 acres of sandy, poorly drained soil. It has been fenced with a hog-tight fence 5 feet in height. There are about 100,000 longleaf-pine seedlings on the area as the result of experiments by Mr. Thompson in both direct seeding and planting, as well as a good stand of young slash pine. The type of soil would indicate that the slash pine will constitute the final stand. A gravel road is now being built past the tract.

The other area contains 255 acres of better-drained soil. A road passes through it, and there is a frontage of a quarter of a mile on Bayou Lacombe. The railroad is about a mile and a half distant. The timber is a mixture of slash and loblolly pines about 30 feet in height, with the former predominating; seed trees of both species are still standing. Mr. Thompson having the stand thinned, the slash pine being favored This area has unusually good recreational possibilities

Plans for handling the tracts are still in the formativ stage. The area will be used for experimental purpose as well as for demonstration and education, and th possibilities of financial returns from timberland wi be emphasized as strongly as is consistent with good forestry practices. Aid in the development of management plans has been requested from the Southern Forest Experiment Station, the Louisiana Division o Forestry, and the department of forestry of the Louisiana State University.

Black Locusts Successful in Idaho

Black locust trees planted in Idaho for windbreaks shelter belts, and farm timber have responded remarkably to irrigation, according to reports of the State's extension forester. On a farm near Moscow black locusts planted 22 years ago have reached 14 inches in diameter. The owner estimated the gross yield from a quarter acre on which the timber was recently cut at $10 a year from the time of planting. On an adjoining strip cut four years ago some of the sprouts from stumps and roots were found to be 20 feet high and 4 inches in diameter.

The locust borer, which has been a menace to eastern plantings, has not appeared in Idaho.

Institute of Paper Chemistry Receives Memorial Building

A library and laboratory building presented to the Institute of Paper Chemistry, graduate technical school affiliated with Lawrence College, Appleton, Wis., was recently dedicated to the memory of J. A. Kimberly, pioneer paper manufacturer of Wisconsin and father of the donor, James C. Kimberly. The new $100,000 building will house the colloid chemistry, wood technology, and optical laboratories, and the library.

Thirty-five students, graduates of 22 colleges and universities, selected from more than 200 applicants, are enrolled in the institute this year.

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A course in professional forestry designed especially to train young men for forest work in the southern California region will be offered for the first time this fall at the University of California at Los Angeles.

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Each 4-H club member in Virginia selecting a reforestation project can obtain up to 1,000 tree seedlings free from the Virginia forest service.

Forestry Training in British Universities Studied

A committee of British foresters and educators appointed by the Secretary of State for the Colonies "to consider and report on the training of candidates and probationers for appointment as forest officers in the government service," has made an interesting report on the results of its investigations.[1] The curricula in the forest schools of the five British universities offering a degree or diploma in forestry—Oxford, Cambridge,[2] Aberdeen, Edinburgh, and Wales (Bangor)—were carefully studied in connection with the actual practical qualifications proved necessary by experience for forest officers in different parts of the Empire. The conclusions and recommendations of the committee are summarized in the report as follows:

(1) When the requirements of the services are taken into consideration the courses of instruction in forestry now given in the universities are not satisfactory, particularly in respect to field work;

(2) A forest officer can not be adequately trained in a course restricted to three years;

(3) The cost of extending the forestry courses to four years in all the universities concerned and of bringing each course up to the required standard would be prohibitive;

(4) The services offer the main opportunities for the employment of graduates in forestry, but each year only 20 to 25 probationers are required. This demand is unlikely to be exceeded in the near future;

(5) For the requirements of the services it is unnecessary to have as many as five schools of forestry, and the provision of additional State aid in support of these schools can not be justified under existing conditions;

(6) The standard attained by the candidates who present themselves for appointment to the services affords evidence that recruitment is on too narrow a basis;

(7) We recommend that in future the course of training should extend over four years, of which the first three only should be taken at one of the university schools of forestry, the final year being spent at the Imperial Forestry Institute;

(8) The university degree courses should be remodeled so as to concentrate the training on the fundamental aspects of forestry, as exemplified by European practice, omitting the more highly specialized branches of the subject;

(9) The Imperial Forestry Institute should be made responsible for instruction in the specialized subjects named in our report, and should become a permanent and essential feature of the preservice training of forest officers;

(10) Provision should be made to facilitate the recruitment of candidates who have read for honours in arts or science. This can best be secured by the institution of a scholarship scheme, the conditions of which should be kept as elastic as possible;

(11) We recommend that any university which desires to present candidates for the forest services should be required to maintain its instruction at a satisfactory level of efficiency, and we suggest the means by which this can be secured.

Present forestry work at the Imperial Forestry Institute at Oxford was commended, but recommendations were made that the following seven courses should be offered during the fourth or final year, of which students should be required to select not less than six: Forest policy, economics and law; tropical forestry and botany; British silviculture (special problems); forest engineering; advanced forest mycology and forest entomology; wood technology; and forest soils.

University of California Adds New Wood Specimens to Its Lumber Exhibit

One of the most complete exhibits of lumber in the United States is now on display in Giannini Hall, at the University of California, Berkeley. The recent acquisition of 19 new specimens (14 of woods of the United States and 5 from foreign countries), brings the total number on display to 180, according to Emanuel Fritz, associate professor of forestry at the university.

The new foreign specimens, which increase the number of foreign woods represented to 115, are of teak from Siam, macuba and rosewood from Brazil, and cocobolo and lignum-vitæ from Central America. Macuba wood is being sold in the San Francisco region for use in fancy cabinet work. Specimens of American woods recently acquired include beech, birch, maple, tupelo, basswood, magnolia, Tennessee red cedar, quartered red oak, plain red oak, quartered white oak, plain white oak, hickory, and ash.

Supplemented by three or four thousand specimens kept in the laboratories of the forestry department, the exhibit woods are used for actual study by forestry students.

Louis Marshall Memorial Dedication Postponed

Dedication of the Louis Marshall Memorial, the new science building at the New York State College of Forestry, Syracuse University, announced for November 18, has been postponed until February or March of next year. The ceremonies will take place after the building is occupied by the science departments of the college, which are expected to start regularly functioning there at the beginning of the second semester.

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Students of vocational agricultural schools in Georgia are encouraged by the State division of forestry to collect tree seed which the division buys for planting in the State forest nurseries.

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[1] Great Britain, Colonial Office: The Training of Candidates and Probationers for Appointment as Forest Officers in the Government Service. Colonial No. 61, 55 pp. London, 1931.

[2] Since publication of the report the general board of Cambridge University has definitely decided to discontinue its department of forestry after October, 1935, when the last examination for the diploma in forestry will be given. This action had already been under consideration.

Connecticut 4-H Forestry Club Wins First Prize at State Fair

"The Easton Forest Rangers," a 4-H forestry club of the town of Easton, Conn., won first place with their forestry exhibit at the annual State club fair, held at Durham, in competition with exhibits of all agricultural and home-making clubs of the State. The exhibit not only excelled in general make-up and appearance, but exemplified the organization's ideal of community service.

The club members are well equipped and trained for forest fire-control activities in their community. The State forest service has provided them with fire pumps and tools and has enlisted them as one of its registered crews. Another example of their community service is the management of the Easton town forest, an undeveloped area of young hardwoods. About a year ago the town suggested that the club take charge of this forest and develop it. The club accepted and divided the area into plots with a boy assigned to eac plot. Weeding and thinning was undertaken und the supervision of a competent local leader. Alreac several acres have been improved.

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Forty vocational agricultural schools in 25 Oh counties planted 220,000 forest trees during the pa year, an increase of nearly 100,000 over last year record, reports F. W. Dean, extension forester Ohio. The trees planted were principally red, Scotc Corsican, and Austrian pines. They were distribute at the rate of 1,000 each to vocational agricultur students making application on special blanks pr vided by the State department of forestry, the onl charge being for transportation. The trees we 2 and 3 year seedlings, ranging from 5 to 10 inches i height. Most of them came from the State fore nursery at Marietta.

Forest Service Notes

Forest Canopy Left After Logging Reduces Fire Danger

By H. T. Gisborne, United States Forest Service

Every timberland owner knows that if he cuts most or all of the trees on a forest area he lets in the sunlight and the hot, drying winds which the dense forest canopy excluded. Few, however, appreciate the effect of such openings in causing drier fuels and higher inflammability and in creating a danger which threatens not only the forest growth remaining but also surrounding timber, adjacent buildings, and other property. The owner may have noticed on previous cutting areas that the removal of the canopy endangers young growth by exposing tender seedlings to the excessively high temperatures of full sunlight and saplings and poles to sun scald and cat face, and dries out the ground so that new seedlings are not able to obtain sufficient moisture to survive the period of maximum drought. He has probably not measured these conditions; he only knows that there is great danger of fire on such areas.

Measurements recently made at the Priest River branch of the Northern Rocky Mountain Forest Experiment Station show the extent of that danger and also indicate that it is possible to cut timber without incurring these after effects. This can be done by using the so-called selection method of cutting which removes the merchantable and undesirable trees in the stand yet retains enough crown canopy to shade the ground and the mat of leaves and twigs covering it. This shade is the best insurance that the soil moisture will be sufficient for seedlings and that the dead leave and twigs on the ground will not become extremel dry and inflammable.

The following measurements were made at thre stations, one fully timbered, one with half the fores canopy removed, and one clear-cut, only a few hundre yards apart in a northern Idaho valley bottom.

Factor measured	Fully timbered area	Half-cut area	Clear-cut area
Average maximum air temperature (degrees Fahrenheit)	83.9	86.9	90.
Average relative humidity at 5 p. m. (per cent)	23.4	19.0	16.
Average wind movement (miles per day)	2.0	24.8	49.
Evaporation rate (grams per period)	34.7	93.4	206.
Average maximum temperature just below surface of duff (degrees Fahrenheit)	78.8	93.6	133.
Highest duff temperature (degrees Fahrenheit)	85.0	102.0	148.
Average moisture content of duff (per cent)	10.5	9.9	4.
Average moisture of 2-inch-diameter dead wood (per cent)	8.3	7.2	3.

One of the most striking features in this tabulation is the extremely high temperature of 148° F., measured just under the surface of the dead leaves and twigs forming the carpet of duff covering the mineral soil. At the surface of the duff, in the full blast of the sun, the temperature was probably even higher than 148°. As surface temperatures above 120° to 125° F. are recognized as dangerous to young seedlings and temperatures of over 140° are generally fatal, the danger in such exposure to the sun is very clear. Under the partial shade of the trees reserved from cutting, however, the temperature rose to only 102°, while under the almost complete shade of the undisturbed forest the maximum temperature in the duff rose to only 85°, or 1.1° above the highest air temperature recorded.

These conditions illustrate the effect of the tree crowns in absorbing direct sunlight and thereby preventing high temperatures in the ground and in the fuels on the ground. Air temperature, humidity, evaporation rate, and wind movement, other factors which make for drier fuels and faster spread of fire, were all improved by the presence of the crown canopy.

It is also evident from the measurements that removing half the timber canopy in order to log the merchantable trees and remove those diseased or otherwise defective did not result in drying out the site to the condition halfway between full timbered and clear cut. The measurements on the half-cut area resemble those for the fully timbered more than those for the clear cut. In other words, although half the crown canopy was taken out, the danger was not increased proportionately.

One important fact should be brought out here: Burning of débris must be done with extreme care in order to save all of the green canopy left after logging. If the burning is done at the wrong time of year or débris is burned broadcast rather than in piles, all the beneficial shade will be lost, and the area, fully exposed, will, after all, become a fire menace.

Aluminum Sulphate Saves Douglas Fir Seedlings at the Monument Nursery

Experiments with various chemicals to find a remedy for a disease threatening the growing of Douglas fir in the Monument Nursery, on the Pike National Forest, Colo., brought forth the discovery of the beneficial effects of aluminum sulphate. Douglas fir had been grown successfully in the nursery from 1907 to 1918, seeming well adapted to the site. In 1918 spots of weak and yellow seedlings appeared in the beds of 1–0 stock. The number of diseased seedlings which seemed to be affected by a root rot increased until in a few years it began to look as if the production of Douglas fir at the nursery would have to be discontinued.

Through the advice of Carl Hartley, forest pathologist of the Bureau of Plant Industry, a series of experiments was tried, which included the use of sulphuric acid, zinc sulphate, aluminum sulphate, ammonium sulphate, tannic acid, hydrated lime, Semesan, Uspulun, and sulphur. Different degrees of shade, moisture, and manuring were also applied to experimental plots. The results were negative for everything except the aluminum sulphate. Plots treated with this chemical showed remarkable improvement, and subsequent use of it on three-fourths of the Douglas-fir seed-bed area at the nursery was completely successful in eliminating the disease.

Solutions of aluminum sulphate of varied strengths are now used on all species at the Monument Nursery. The chemical lessens damping off, is an excellent weed eradicator, stimulates growth, and is a preventive of root rot. It is cheap, easy to apply, and does not damage clothing.

Pacific Northwest has Heavy 1932 Seed Crop

Reports from the 22 national forests of Oregon and Washington indicate that the forest trees of the Pacific Northwest are bearing an abundant supply of seed this year. Douglas fir is laden with cones over the entire west slope of the Cascade Range. This is the sixth abundant seed crop of that species since 1909 and practically assures the natural restocking of logged-off lands adjacent to standing Douglas fir timber. Other species reported to have a good seed crop include western hemlock, western red cedar, Port Orford cedar, white fir, Engelmann spruce, Sitka spruce, western white pine, sugar pine, and western larch. The ponderosa pine seed crop is heavy in some localities but is irregular.

Seed collectors this year include many unemployed who are gathering seed for sale to dealers.

Denver Unemployed Cut Wood on the Pike Forest

An interesting municipal plan for utilizing the services of the unemployed to obtain fuel for the needy is being carried out by the city of Denver, Colo. Under a free-administrative-use permit the city last spring established on the Pike National Forest two camps where wood is cut by men dependent upon the public for support. Each man is detailed to the camp for a period of three weeks. He receives no compensation in cash but is furnished clothes and tobacco, and his family in the city is supported.

The camps are managed by the city, but forest officers mark or designate the trees for cutting and the Forest Service furnishes a good deal of the equipment used in the operation. Cutting costs about 75 cents per standard cord. A portion of the wood has been hauled in trucks to Denver, a distance of 60 miles, at $3.50 per cord. The Colorado & Southern Railway Co. has given the city free freight to a value of $1,000 and wood is now being hauled to Estabrook, Colo., for shipment to Denver via the railroad.

The first camp to be established is about 9 miles from Buffalo, Colo., on lower Redskin Creek, in the ponderosa pine-Douglas fir type, at an elevation of 7,900 feet. The region surrounding the camp was recently cut over, but sapling and pole stands were left in which no cutting was done. These stands are thinned, sticks as small as 1 inch in diameter being utilized. In addition the tops and cull logs left from the old cutting as well as the pitch stumps that have lain on the ground for many years are used. All green trees to be cut are marked by a forest officer, and a well-spaced, improved stand, averaging from 250 to 300 trees per acre, remains after cutting.

The other camp is located about 7 miles from Estabrook, toward the head of Redskin Creek, at an elevation of 8,400 feet. It is near the lower limits of the lodgepole-pine type. The stand in the vicinity of the camp consists almost entirely of saplings and small poles, the number per acre varying from 5,000 to 10,000. It is typical of stands on extensive areas in the Rocky Mountain region that were burned over about 50 or 60 years ago. Studies of sample plots established a few years ago by Supervisor E. S. Keithley, of the Pike Forest, indicated that such stands should be thinned to leave about 400 to 450 trees per acre; this number is being retained in the present thinning. The average diameter of the trees left is about 3½ inches at breast height. A forest officer marks with red paint the trees to remain and all others are cut. All material 1 inch or larger in diameter is utilized for fuel, an average of 7 cords being obtained per acre.

The forest as well as the city benefits from these cuttings, as they are of great value from the standpoint of silviculture and fire protection. Growth will be greatly stimulated, and the thinned stands, especially in the lodgepole-pine type, will be much more easily protected from fire than the unimproved, dense forest. A total of about 500 acres of forest lands has been put into very satisfactory silvicultural condition and probably an additional acreage of an equal amount will have been improved before the work is discontinued in the early winter.

Douglas Fir Region Gets Experimental Forest

A 10,000-acre tract of typical Douglas-fir timberland within the Columbia National Forest, Wash., has recently been set aside for research and demonstration purposes. The area lies near the geographic center of a broad belt of Douglas-fir land that extends north into Canada and south into California on the west slope of the Cascade range. It will be known as the Wind River Experimental Forest and will serve as a field laboratory and proving ground for the Pacific Northwest Forest Experiment Station.

The area is located on the Wind River watershed 10 miles north of Carson, Wash., and contains 4,500 acres of typical old-growth virgin timber, 3,500 acres of second growth now 90 years old, and 2,000 acres of burned-over land in varying degrees of restocking, part of which has been reforested by planting. Of the old-growth area, 1,200 acres will be set aside as a natural area to be kept in its virgin state for educational and scientific purposes. Studies, many of which are already under way, will cover economic selective logging and other methods of lumbering, slash disposal, fire prevention and control technic, natural and artifici reforestation, growth and yield studies, thinning control of insects and disease, and the interrelation plant and animal life in the forest.

Much Heart Rot Enters White Oaks Through Fire Wounds

By Margaret S. Abell, United States Forest Service

Heart rot was the cause of cull amounting to 40 pe cent of the total gross board-foot volume of 56 whit oaks examined immediately after a logging operation i 1930 on the Natural Bridge National Forest, Va., b R. M. Nelson and I. H. Sims, of the Appalachian Fores Experiment Station. The cull was nearly all in lon butts and first logs, although one entire tree was left How the heart rot had entered many of the trees wa indicated by readily distinguishable fire scars; other were either hollow or so badly rotted that the point o entrance of the fungi could not be definitely determined

The 56 trees studied were classified as follows: Soun trees with fire scars, 7; sound trees with no fire scars, 10 trees with rot traced definitely to fire scars, 18; badl rotted and hollow trees, 21. Logs were scaled an deductions made according to national forest practice In the 18 fire-scarred trees containing rot 48 per cent of the total gross scale was left in the woods. It is ver probable that the decay in many of the badly rotted an hollow trees, of which 58 per cent by volume was left had also entered through fire wounds.

These trees were in a mixed oak stand which ha been heavily cut about 1810. It had been burned ove repeatedly before the establishment of the nationa forest in 1927. Scars gave evidence of 30 different fires ranging from 236 to 40 years before the examination. Some of the trees were overmature and the rot advanced.

Similar conditions have been found in other southern Appalachian hardwoods. G. G. Hedgcock states in the 1926 Yearbook of Agriculture, under the title "Fire-Scar Damage in Woodlands Heavy," that as high as 19 per cent of the volume in our eastern hardwoods is often lost through decay, of which more than 90 per cent of the basal or butt-rot type enters through fire scars. The report of the Forest Products Laboratory entitled "Small Sawmill Utilization of Appalachian Hardwoods," the result of a study in the Pisgah National Forest, N. C., attributes 17 per cent of all defects in red oak to fire; in chestnut, 20 per cent; and in basswood, 18 per cent. This includes actual fire damage and decay associated with fire scars under the heading "fire" in the classification of cull. Much larger percentages of the defects were charged to "rot or punk." In part of these fire may have been a factor.

That in the southern Appalachian hardwoods heart rot entering through fire wounds results in considerable cull is evident. There is little knowledge, however, of the variation of this form of damage in different stands and sections of the region.

Pacific Coast Forest Preserved as Natural Area

A tract of some 1,400 acres of the spruce-hemlock type within the Olympic National Forest, Wash., has been set aside to be kept in its natural state for educational and research purposes. It lies on the Olympic highway at the south approach to Lake Quinault and will be known as the Quinault Natural Area. The tract contains some of the finest specimens of Sitka spruce to be found in the few remaining stands of old growth in this timber type. Some of the best Sitka spruce timber obtained by the Government for airplane construction during the World War was cut from adjoining lands.

Funds Apportioned for National Forest Highways

Building of new highways in the national forests will be rushed with funds appropriated by Congress primarily to aid in relief of unemployment. The new roads will also open up the forests to greater use and assist in protection from forest fires.

The national forest highway fund of $5,000,000 is allocated for expenditure in the various States, half according to the national forest area within the State and half to the ratio that the value of national forest land in the State bears to the total value of national forest lands in all the States. Thirty-three States and Puerto Rico will share in the distribution of the fund for the fiscal year 1933 in the following amounts: Alabama, $4,811; Arizona, $347,798; Arkansas, $54,315; California, $829,566; Colorado, $397,542; Florida, $20,403; Georgia, $11,739; Idaho, $614,336; Illinois, $478; Louisiana, $2,390; Maine, $1,672; Michigan, $12,842; Minnesota, $37,932; Mississippi, $1,967; Montana, $480,381; Nebraska, $5,771; Nevada, $111,170; New Hampshire, $26,571; New Mexico, $244,450; North Carolina, $17,435; Oklahoma, $3,844; Oregon, $773,121; Pennsylvania, $11,323; Puerto Rico, $649; South Carolina, $1,976; South Dakota, $46,368; Tennessee, $15,028; Utah, $198,583; Vermont, $1,910; Virginia, $19,055; Washington, $426,481; West Virginia, $9,360; Wisconsin, $5,131; Wyoming, $263,602.

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Malacosoma disstria, the forest tent caterpillar, which did much damage in the Natural Bridge National Forest, Va., in 1931, made a still more destructive attack on trees in that region in May and June, 1932. Nearly every species suffered, but oak was particularly affected. Many trees were killed and more will undoubtedly die from the effects of defoliation, especially on the drier sites.

General Forest News

A Remnant of Mississippi's Virgin Hardwoods

By Gus Lentz, United States Forest Service

Three hundred and ninety years ago, exactly 50 years after Columbus landed at San Salvador, Hernando De Soto claimed the honor of being the first white man to view the mighty Mississippi. After journeying across what is now north Georgia and Alabama, De Soto and the other "white gods" who came with him entered the alluvial valley and proceeded into the country of the Chickasaws. Historians mention the vast stretches of unbroken timber through which the explorers painfully hewed their way. Progress was slow because of the density of the timber, the presence of many meandering bayous, and the constant fear of ambush. Traveling slowly, the white men had ample opportunity to observe and marvel at the wonderful gum, ash, oak, cypress, and other hardwood trees found on the rich alluvial soils of the Mississippi Delta.

Extensive exploitation of this hardwood timber began more than 40 years ago. Memphis, Tenn., rapidly came to be the center of the southern hardwood lumber industry. Mills were located at numerous points in the Delta. When one tract was cut over the mill was moved to another tract of virgin timber or else new tram lines were built to bring logs from another tract to the old mill. The peak of production was reached for oak about 1909 and for red gum some 17 years later. Since 1926 production in Mississippi has shown a rapid decline. At present only a few of the extensive virgin hardwood stands remain on areas that have proved difficult to log. One such stand was recently encountered in Coahoma County, Miss., by a Forest Survey crew headed by Mark Lehrbas, on an area of unprotected or "batture" land in a bend of the Mississippi River known as Jackson's Point. Some timber has been cut on this point during recent years and the logs floated downstream to Greenville. On a considerable portion of the area, however, the timber is still untouched.

The timber growing on Jackson's Point consists mainly of cottonwood, willow, and box elder on the sandy soils; red oak, overcup oak, and red gum on the well-drained clay soils; and pure stands of cypress on the poorly drained clay soils. On one quarter-acre sample plot in the cypress type the following tally was obtained: Number of cypress trees 14 inches in diameter breast high, 6; 16 inches in diameter, 4; 18 inches in diameter, 3; 20 inches in diameter, 8; 22 inches in diameter, 4; 24 inches in diameter, 7. Volume tables gave an estimated stand of 8,440 board feet, Scribner scale, per quarter acre, or about 33,700 board feet per acre.

On another quarter-acre plot where red gum and ash predominated, the tally was: 1 ash tree 14 inches in diameter breast high; 1 ash 30 inches in diameter; 1 ash and 2 red gums each 32 inches in diameter; 1 red gum 40 inches in diameter; and 2 red gums 44 inches in diameter.

On the latter plot the stand was estimated to contain 4,600 board feet of ash and 36,000 board feet of red gum, or a total of 40,600 board feet, per acre. Several of the red gum trees were more than 155 feet high; one tree 32 inches in diameter had a total height of 166 feet. In spite of their great height none of the red gum trees contained more than three merchantable logs, or more than 50 feet of usable stem. This illustrates the absolute necessity of basing volume estimates on the usable length of the bole rather than on total height. Furthermore, in dense stands it is difficult to measure total heights accurately.

The vast stretches of virgin southern hardwood timber, the former roosting place of the passenger pigeon, have almost followed the pigeon into extinction. Were De Soto now to retrace his steps across the upper portion of the Delta he would have to traverse an almost unbroken series of cotton and corn fields. Unless measures are taken to preserve a few of the remaining stands of virgin hardwood, the coming generation of Delta inhabitants will scarcely believe that such stands of timber were ever found on the fields where they follow the cotton-patch mule or wield the hoe between the cotton rows.

Blister Rust Quarantine Regulations Revised

A revision of the white pine blister rust quarantine regulations which have been in effect since October 1, 1926, was approved September 10 to become effective January 1, 1933. Five States—Iowa, Maryland, Ohio, Virginia, and West Virginia—are added by this revision to the list of those designated as infected with the rust, which already included Connecticut, Idaho, Maine, Massachusetts, Michigan, Minnesota, Montana, New Hampshire, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Vermont, Washington, and Wisconsin. Since the District of Columbia is surrounded by infected States, it is also classed as infected, although the blister rust has not yet actually been found there.

The new regulations will widely increase the market for 5-leafed pines raised under conditions in which they are protected from rust infection. The embarg which prohibited the shipment of such pines fro infected to noninfected States is removed, and th Federal pine-shipping permits which heretofore author ized shipments only between infected States may no be used for shipments to noninfected States als The change is based on the satisfactory results of th protective work carried out around nurseries durin the past several years.

At the same time the interstate movement into othe infected States of 5-leafed pines grown in the lightl infected States is somewhat more restricted tha heretofore, experience indicating that such pines shoul be raised in a Ribes-free environment to be safe fron blister rust.

The embargo which has hitherto prohibited th movement of 5-leafed pines from points east of th Missouri Valley to the Western States is removed.

The interstate shipment of currant and gooseberr plants is also simplified by the elimination of the provision that such plants, if transported from infecte States, were required to be both dormant and dippe in lime-sulphur solution. Hereafter such plants wil not be required to be disinfected in lime-sulphur unles shipped with leaves or active buds.

Nut Growers Visit Experimental Chestnut Forest

By W. R. MATTOON, United States Forest Service

During their twenty-third annual convention, held this fall in Washington, D. C., the Northern Nut Growers Association (Inc.), made a field trip in near-by Maryland in the course of which the members visited several private nut orchards and inspected Government experimental work in chestnut propagation at Bell Station, Prince Georges County, Md. Here the Bureau of Plant Industry and the Forest Service are carrying on experiments in the breeding of blight-resistant chestnuts. Various species of Asiatic chestnuts have been introduced and crossed with the American chinquapin and the more resistant strains of native chestnuts. A plantation of Chinese mountain chestnut (*Castanea mollissima*) 21 years old is being watched closely. Shipments of nuts from these trees have been made to some of the States where they have been planted on State and selected private lands under the direction of the State foresters. Neither this species nor the hybrids have so far shown a development equal to that of the American chestnut. A tendency to crooked trunks and a slow rate of growth have yet to be overcome. G. F. Gravatt, of the Bureau of Plant Industry, is in charge of the experiments.

At the Washington meetings of the association many phases of nut growing were discussed, particular interest being shown in black walnut and northern varieties of pecans.

New Forestry Films Available

Four motion-picture films on forestry subjects recently prepared by the Forest Service may now be borrowed from the Office of Motion Pictures of the United States Department of Agriculture, only the cost of transportation to be paid by the borrower. Titles and descriptions of the films are as follows:

Building Truck Trails in the National Forests. Silent, one reel. Depicts use of modern machinery in construction of roads for quick transportation of men and equipment to forest fires; also shows spread of unchecked fire.

Forest Fires—or Conservation? Talking, three-fourths reel. Shows Secretary of Agriculture presenting to Scott Leavitt, United States Representative from Montana, a commission as a volunteer fire warden in his State. Mr. Leavitt makes a short talk on the importance of forest conservation, illustrated by forest scenes.

Two Generations. Silent, four reels. The story of a young man and his inherited Kentucky farm and forest; better forestry practices applicable to hardwood forests and the necessity of keeping out forest fires illustrated.

Approved Sheep Management on National Forests. Silent, two reels. Scenes in the life of the sheep herder, including some magnificent mountain views in Montana and California; approved management methods and marketing activities shown.

Tax-Reverted Lands Studied in Arkansas

In Little River County, Ark., more than 300 landowners, or about 1 in 7, have been unable to pay their taxes for 1929 or earlier years, and as a result 20,000 of the total 349,440 acres of land included in the county have reverted to State ownership. This summer a group of men representing the University of Arkansas and the United States Forest Service have examined sample areas of this tax-reverted land and have classified them on both a physical and an economic basis. By analyzing the resulting data they expect to learn something about the reasons why this land has been relinquished to State ownership and something about the uses to which it is best adapted. L. M. Turner, assistant professor of forestry, and O. J. Hall, assistant professor of rural economics, are collaborating in this study with R. B. Craig, assistant forest economist of the Southern Forest Experiment Station. The university and the station have each provided one other field investigator.

Little River County borders on Texas and on Oklahoma. Woodlands compose 67 per cent of its area. Its fertile bottom lands are devoted principally to producing cotton and corn, but support some bottomland hardwood timber. The eastern half of the county consists of flat to gently sloping plains at a level from 25 to 40 feet above that of the bottoms. Here shortleaf pine, loblolly pine, and hardwoods grow in mixture, in farm woodlands and in larger blocks under corporate ownership. On the rolling uplands that form the western half of the county timber occupies a somewhat smaller area and is largely restricted to farm woodlands.

Professors Turner and Hall and Mr. Craig have classified sample areas as to topography, general physical character of the soil, and erosion. They have recorded present use of land; proportion of pasture, crop land, and timberland; timber species; quality of sites for timber production; and proportions of timberland occupied by old-growth and second-growth timber. A 5 per cent cruise has been made of lands bearing merchantable timber, which will give figures indicating volume of timber per acre, site quality, and volume growth of timber in the last 10 years. Economic data cover ownership, residency of owner, status as to delinquency, and year for which taxes are delinquent. The study includes about 37 per cent of the tax-reverted land in Little River County. For purposes of comparison it takes in some areas in the county that are tax delinquent but have not yet reverted to the State (as of June 10, 1932, lands in this classification total 100,587 acres), and also some areas on which the taxes are paid. In addition to the classification of specific delinquent areas a study is being made of the finances of the county government over a 5-year period.

Economic and agricultural conditions in Little River County are believed to be representative of those in several counties of southwestern Arkansas. In Washington County, chosen by the university as representative of the Ozark region, Professor Hall has plotted tax-reverted lands preparatory to a study similar to that in progress in Little River County.

For Arkansas as a whole the proportion of tax-reverted land is about 4½ or 5 per cent. This percentage is only a little above the average for the seven States—Florida, Alabama, Mississippi, Louisiana, Arkansas, Oklahoma, and Texas. The Forest Service hopes that it will be possible to duplicate the Arkansas study in each of the six other States named.

Doctor Herty Hopes to Eliminate Sap Stain in Pine Pulp

Sap stain, or blue stain, can probably be avoided in pines used for making paper pulp by utilizing the log immediately after the tree is cut. Discovery of this method of eliminating the problem caused by the stain was recently announced by Charles H. Herty. A green log put through the pulping process at the experimental laboratories at Savannah, Ga., of which Doctor Herty is in charge and where he has already established the suitability of slash, loblolly, and longleaf pines for use in the manufacture of paper pulp, turned out a pulp practically as white as the bleached product of the paper mills.

Observations indicate that sap stain will appear in the wood within two weeks after the tree is cut, although the exact time it takes for the fungus producing it to attack the wood has not been definitely determined. Use of green wood means that seasoning can be eliminated, the timber owner being able to take his logs to the pulp mill as soon as they are cut, and that the mill, by using the logs at once, can eliminate or considerably decrease bleaching costs.

While he has shown that the manufacturing process can get ahead of the sap stain and that the green log produces a remarkably white paper pulp, experiments with the grinding machine have yet to be made. Doctor Herty anticipates that these will show a longer fiber and whiter and better pulp. Results of treating green log chips with the sulphite process, which removes the lignin and leaves isolated the cellulose fiber from which the pulp is made, indicated this probability by producing a strong white fiber, and Doctor Herty believes the ground wood pulp from the same green logs will show up equally well.

Defoliating Insect Active in California Brush Fields

By Hubert L. Person, United States Forest Service

The California tortoise-shell butterfly (*Aglais californica*), which caused widespread defoliation in the Shasta brush fields in 1910 and 1911, is becoming abundant again in the redwood region. J. M. Miller, of the United States Bureau of Entomology at Berkeley, reported the occurrence of this defoliator on the Stanislaus National Forest above Strawberry, Calif., in 1930 and in parts of southern Oregon in 1931. During the early summer of 1932 reports of the complete defoliation of large areas of blueblossom (*Ceanothus thyrsiflorus*) were received from cut-over areas of the Union Lumber Co. on the Redwood Creek drainage of Mendocino County. One defoliated area of nearly 100 acres was said to appear from a distance as a brownish patch surrounded by green blueblossom.

On June 24, 1932, an area of about 30 acres in Humboldt County was found infested by the California tortoise-shell butterfly and was examined. It supported an almost pure stand of blueblossom, 8 to 12 feet in height, with occasional clumps of redwood sprouts, willow, hazel, thimbleberry, huckleberry, and Baccharis. Blueblossom was plainly the preferred host, as it was completely defoliated throughout the infested area. The large number of dead upper branches indicated that many of the bushes had also been attacked in 1931. Of the other vegetation only the willow growing in with the infested blueblossom had been affected, and it was only partially defoliated.

At the time this area was examined most of the caterpillars were mature or had already pupated. The mature larvae are about 1½ inches in length and black with grayish hairs. Each abdominal segment i armed dorsally with a black, compound spine. Whe ready to pupate they fasten themselves to a twig b the last abdominal segment and hang head downward In a short time the dorsal wall of the thorax split open and the chrysalis, which has been forming inside emerges. A slight disturbance starts these pupa wiggling violently, and this movement transmitted t the twigs from which they are hanging gives th infested brush fields a startling appearance. Th butterflies begin to emerge about July 1 and probabl lay their eggs during July.

It is open to question whether this insect is beneficia or harmful in the redwood region. The brush is no usually killed by one defoliation, and where it is kille by repeated attacks the amount of browse lost may b more than equaled by the increase in other forag resulting from the opening up of the brush fields.

◆

An area of 64,255 acres of marsh at the mouth o Bear River, on the north shore of Great Salt Lake Utah, has been set aside as the Bear River Migrator Bird Refuge. About 40 per cent of the area is to b used as a public shooting ground and the remainde will be reserved as a bird sanctuary. Administratio of the refuge is under the Bureau of Biological Survey of the United States Department of Agriculture.

◆

The Long-Bell Lumber Co. confined its fire damage last year to 29 acres of its holdings of 91,000 acres in Arkansas. The company is keeping its woods in continuous production, and fire protection is one of its chief concerns.

◆

Based on the percentage of renewals for the 5-year period ending with 1930, an average life of 23 years for creosoted ties was reported by seven railroads. Some of the ties were sound and in service after 34 years.

◆

By an act of Congress approved July 14, 1932, the District of Columbia has become a bird sanctuary. Shooting of wild waterfowl within the District is prohibited by this law.

◆

A gift of about 3,400 trees and shrubs, representing nearly 1,500 species and varieties, has recently been made by the Boyce Thompson Institute for Plant Research, of Yonkers, N. Y., to the New York Botanical Garden.

Foreign Notes

Mangrove Swamps of Kenya

Mangrove swamps cover about 180 square miles of Kenya, South Africa, according to an estimate quoted by R. M. Graham in the Journal of the East Africa and Uganda Natural History Society. On only about two-thirds of this area can the forests be classed as merchantable.

The commonest and by far the most important tree of the swamps is mkoko (*Rhizophora mucronata*), which grows to a height of about 60 feet and a diameter of about 15 inches. When grown in close stands in good mud, mkoko has a straight cylindrical bole. Its bark is easily stripped from the stems. A striking characteristic of this species is its stilt roots. About the second or third year the first of these roots emerge from the stem at a height of a few inches and grow down into the mud. By the time the tree is well grown it has roots starting about 3 feet or more up the stem. The lower part of the stem, as a matter of fact, after developing to a diameter of not more than 2 or 3 inches becomes unnecessary to the tree and rots away, as do the roots first formed. Old roots are tough, woody, gnarled, and sometimes branched. Roots may be sent down from the stem or branches at a height of 20 feet, but such roots do not become fixed in the mud.

The seed germinate on the trees. The resulting embryos, usually about 15 inches long and ¾ inch in diameter, are pointed at the base and are somewhat thickened for a few inches above this point, so that when they fall they automatically plant themselves in the mud if the tide is out. Embryos falling at high tide float away in a vertical position. It is thought probable that they retain their vitality for many weeks in salt water and are carried considerable distances by the tides and by ocean currents. In good mud the planting of the embryo is followed in about 15 days by the development of underground roots and shortly thereafter by the appearance of leaves. In sandy mud roots may not appear for three or four weeks, and in pure sand they may fail to grow at all.

Mkoko is hardy. Stunted and deformed specimens can be found growing in such unlikely localities as coral outcrops.

Muia (*Bruguiera gymnorhiza*), the largest of the Kenya mangroves, grows to a height of about 80 feet. Individuals of such height, however, are nearly always stagheaded. This tree has no stilt roots, but is buttressed and also throws up knee roots.

Poles are the most important product of these swamp forests. In 1929 about 470,000 poles were sold from the swamps, and about 40,000 were issued free to natives for housebuilding. Most of those sold were exported to Arabia and India. Sales of 1929 included 446,000 stacked cubic feet of firewood. Mkoko bark was formerly sold in large quantities for the sake of its tannin; but since the bark of trees less than 6 inches in diameter has no tannin value and practically all the stands of large mkoko have been cut, this source of revenue is largely exhausted.

Mexico Requires Reforestation of Exploited Timberlands

A decree of the President of Mexico dated May 11, 1932, requires the artificial reforestation of timberlands by individuals or companies removing the forest cover from such lands. The decree reads as follows:

Article 1. Cooperative organizations which exploit forests existing on communal or public lands, as well as persons or companies carrying on such exploitation works on private properties, are obliged to effect the artificial reforestation (of such lands), in accordance with the provisions of the present decree.

Art. 2. It shall be obligatory to effect works of artificial reforestation in the following cases:

I. When, in the opinion of the responsible professional forester, natural reforestation is impossible;

II. When continuous natural regeneration, in the case of coppice, has caused the degeneration of the trees;

III. When the method of treatment justifies the complete clearing of the lands, be they forest or coppice, provided they are not devoted to agricultural cultivation; and

IV. Invariably, when the authorized exploitation within a year is greater than (*a*) 2,500 cubic meters of logs of ordinary, cold-climate woods; (*b*) 1,000 cubic meters of logs of fine, warm-climate woods; (*c*) 75 tons of resin; or (*d*) 20 tons of chicle.

Art. 3. The works of reforestation to which the previous article refers shall have as their principal object the replacement and the improvement of the species of trees the exploitation of which has been authorized.

Art. 4. Professional foresters under whose direction the exploitation of forests is carried on shall attach to their respective technical studies the general reforestation program which, in their opinion, it is necessary to carry out.

Art. 5. The Ministry of Agriculture and Development, through the forestry, game, and fishing section, shall control the reforestation works that are carried on in the country, assisting as much as lies within its power toward the greatest development and distribution thereof.

❦

Willow scab, a fungous disease which first appeared in Nova Scotia seven years ago, is spreading rapidly in the Canadian Maritime Provinces. The spores are carried by wind and rain. The disease causes defoliation of willow trees.

Germination of Wattle Seed Studied in South Africa

Wattle trees having become the source of raw material for an important and growing tanning industry in South Africa since their introduction into the country from Australia about 50 years ago, both black wattle (*Acacia mollissima*) and, to a lesser extent, green wattle (*A. decurrens normalis*) are widely grown there for their bark.

Like many other leguminous seed, those of Acacia remain viable for a number of years, lying dormant until conditions are favorable for germination, one of these being a certain amount of heat. Where plantations are established by direct sowing, it is the custom in South Africa to treat the seed with boiling water before planting in order to obtain rapid germination. Natural regeneration in a cut-over plantation is obtained quickly by broadcast burning of the slash. To ascertain the most effective methods of treating wattle seed to insure a high percentage of germination, laboratory and field studies were made by J. B. Osborn, research officer of the Natal Tanning Extract Co. (Ltd.), and E. Osborn, as the result of which the following conclusions were reached:

For all classes of seed of both green and black wattle the best method of pretreatment so far discovered is to place the seed in a receptable of boiling water (which is then set aside to cool) and allow them to soak overnight or for 10 to 12 hours. The volume of water used should be several times that of the seed to insure contact of all the seed with the water, so that mucilage in the seed coat will be dissolved. After removal from the water the seed should be thoroughly air-dried.

The general physical appearance of the majority of seed remains unchanged by this treatment. It is a fallacious idea that the seed should be boiled or soaked until they are soft. Boiling for 20 minutes kills a certain proportion, while the reduction in germination of seed boiled for 2 hours was 30 to 50 per cent.

Storage after treatment with boiling water for periods of 3 weeks to 11 months improves germinating ability.

❦

Two organizations have recently been founded in Sweden to promote and safeguard the interests of the wood-pulp industry. They are the Swedish Cellulose Association, representing the chemical pulp industry, and the Swedish Wood Pulp Association, representing the mechanical pulp manufacturers.

❦

Unemployed persons in Prussia can obtain free wood by thinning stands of trees under direction of the Prussian Forest Service. They are also allowed to buy firewood which they have cut from dead or defe tive trees for 25 to 40 cents a cord or to work out tl cost by planting trees. More than 200,000 cords wood were cut in Prussia under these arrangemen during the nine months ended January, 1932.

Stumps Removed by Electrical Proces in British Columbia

A new method of clearing land of stumps is bein adopted in the Fraser Valley, British Columbia. A electrically operated fan supplies a direct draft to a fir lighted in the roots of the stump to be destroyed; th air driven at high pressure through a hose fitted wit an iron nozzle feeds oxygen to the flames. The fire i helped along with kerosene or other inflammabl material until the air blast is under way. The stump i soon consumed by this forced combustion and may b quickly removed.

The method is cheaper than the use of dynamite an donkey engines as well as being less dangerous, and it i easier than hauling out the stumps by team and tackle It is said that electric current for the new device cost about the same as that for a vacuum sweeper.

❦

Average annual loss from forest fires in the Dominio of Canada during the 5-year period 1926–1930 wa $4,876,000, in round figures, according to the report o the Director of Forestry for 1930–31. The total i made up of the following items: Loss of merchantabl timber, $2,489,000; estimated loss through destructio of young growth, $1,080,000; estimated loss throug burning over of cut-over land, $166,000; value of othe property burned, $403,000; actual cost of fire fighting $738,000.

❦

In Bulletin 80 of the Canadian Forest Service, British Columbia Softwoods, Their Decays and Natural Defects, the Forest Products Laboratories of Canada have published descriptions of the characteristics, properties, and uses of the softwoods of the Pacific coast of British Columbia and of their various fungi and insect enemies. Measures for prevention of decay of these woods with a list of antiseptics and preservatives known to be beneficial are given.

❦

Forestry commissioners of Great Britain planted 32,330 Douglas-fir trees on sites in England, Wales, and Scotland in 1930. All these trees were raised from seed furnished by the Canadian Forest Service through its seed extracting plant in New Westminster, British Columbia.

Personals

Officers elected for the coming year at the annual meeting of the Association of State Foresters held in New Jersey October 17–19 are: W. G. Howard, superintendent of lands and forests of New York, president; George C. Joy, supervisor of forestry of Washington, vice president; George R. Phillips, State forester of Oklahoma, secretary-treasurer; and G. M. Conzet, director of the division of forestry of Minnesota, and Page S. Bunker, State forester of Alabama, members of the executive committee.

Hugh P. Baker has resigned his position as dean of the New York State College of Forestry at Syracuse University to become president of the Massachusetts State College, Amherst, Mass.

F. A. dos Santos Hall, assistant professor of forestry in the University of Lisbon, Portugal, who has been studying forest mensuration methods in America for a year under a Portuguese Government fellowship, left in September for Lisbon to resume his professional duties. Much of his time here was spent in the Washington office of the United States Forest Service, where he studied construction and use of volume tables for estimating timber stands. He also took several trips into eastern and southern forest regions, making an extensive tour of the naval stores producing forests of Florida.

R. V. Williamson has recently been placed in charge of a new research laboratory in McCloud, Calif., by the McCloud River Lumber Co. and the Shevlin-Hixon Co., of Bend, Oreg. The two lumber companies have united in equipping the laboratory, where experiments will be carried on to establish new uses for pine products, with particular emphasis on ponderosa pine.

F. G. Miller, dean of the school of forestry of the University of Idaho, has returned from Europe where he spent a period of sabbatical leave visiting the principal timber-producing regions and studying European forestry methods and practices.

Henry I. Baldwin, formerly in charge of forest investigations for the Brown Co., Berlin, N. H., will spend the academic year 1932–33 teaching silviculture in the Department of Forestry of the Pennsylvania State College, substituting for Asst. Prof. H. J. Lutz, who is studying for a Ph. D. degree at Yale University.

Howard W. Morgan, who has been with the Oxford Paper Co., Oxford, Me., for five years, has been appointed instructor in pulp and paper manufacture at the New York State College of Forestry of Syracuse University, of which he is a graduate. Mr. Morgan took an active part in the development and operation of the Oxford Co.'s research laboratory.

S. B. Show, regional forester of the California region of the United States Forest Service, has been reappointed a member of the State labor camp committee for 1932 by the Governor of California.

C. H. Coulter, former assistant State forester of Florida, has been appointed cooperative agent to assist naval stores operators in developing improved naval stores practices in Florida under a cooperative agreement between the Florida Forest Service and the Bureau of Chemistry and Soils of the United States Department of Agriculture. Mr. Coulter will perform the function of carrying to the operators information obtained by research at the Southern Forest Experiment Station and the Naval Stores Station. He will make his headquarters at Lake City, Fla.

Ralph C. Hawley, professor of forestry at the Yale School of Forestry, has been appointed associate editor in charge of dendrology, silvics, and silviculture of the Journal of Forestry. He succeeds Carlos G. Bates, who recently resigned.

Ellwood Wilson, formerly forester for the Laurentide Paper Co., Quebec, now professor of silviculture at Cornell University, has been presented with a scroll of recognition by the Canadian Society of Forest Engineers in appreciation of his services to forestry in Canada.

Nelson C. Brown, professor of forest utilization at the New York State College of Forestry, Syracuse University, has been appointed a national director of the Izaak Walton League of America for a term of three years.

Walter J. Quick, jr., assistant State forester of Maryland, has been granted an eight months' leave of absence which he will spend at the Yale School of Forestry working for the degree of master of forestry.

Percy M. Barr has accepted a permanent appointment as assistant professor of forestry to teach forest mensuration and management at the University of California. Doctor Barr, who for some years has been in charge of the research division of the British Columbia Forest Service, taught at the University during the second semester of the school year 1931–32. C. D. Orchard succeeds Doctor Barr in British Columbia.

Nels E. Peterson, district ranger on the Angeles National Forest, has been awarded the 1932 Harvey S. Bissel gold metal for the most outstanding accomplishments in forestry and fire prevention among officers of Federal, State, and county forestry organizations in southern California.

Nineteen fellowships have been granted this year by the New York State College of Forestry, Syracuse University, to graduate students especially qualified to take up advanced work. Fellowship appointments have been made to: Arthur J. Barry, B. S., New York State College of Forestry, for work in paper and pulp manufacture; Charles E. Beardsley, B. S., University of Minnesota, in forest utilization; Mason B. Bruce and David Campbell, New York State College of Forestry, in silviculture, one-half each for second semester; Frederick S. Crysler, B. S., New York State College of Forestry, in forest chemistry; W. E. McQuilkin, B. S., University of Nebraska, in botany; N. D. Wygant, B. S., Purdue University, in forest entomology; Walter C. Gates, B. S., New York State College of Forestry, in forest utilization; Ellwood S. Harrar, jr., B. S. and M. S., New York State College of Forestry, in wood technology; Arne Haugberg, B. S., Royal College of Agriculture, Norway, in utilization; John H. Hawkins, B. S., Michigan State College, in forest management; Ludwig V. Kline, B. S. and M. S., New York State College of Forestry, in forest botany; George Kratina, B. S., New York State College Forestry, in wood technology; James S. Kring, B. S Colorado Agricultural College, in forest botany; Ke neth O. Maughan, B. S., Brigham Young Universit and M. S., New York State College of Forestry, i recreation and park engineering; F. M. Meade, B. S New York State College of Forestry, in silvicultur Nelson F. Rogers, B. S., New York State College Forestry, in forest management; A. R. Sanford, B. S. F University of Maine, in forest management; Eric W Stark, B. S. F., Purdue University, in wood technolog and R. A. Vogenberger, B. S. S., Penn State Fores School, and M. S., Penn State College, in silvicultur

Changes recently made in the organization of th Pennsylvania Department of Forests and Water include the transfer of W. E. Montgomery from th position of chief of the bureau of accounts and maintenance to that of chief of the bureau of forest management and parks. Alfred E. Rupp has been permanently designated chief of the bureau of lands.

Bibliography

A 10-Year Series of Naval Stores Experiments

By Austin Cary, United States Forest Service

Lenthall Wyman, associate silviculturist in the Forest Service, who has for nearly 10 years been engaged in experimental work on naval stores practice, gives an account of his results up to the year 1930 in Technical Bulletin 298 of the United States Department of Agriculture.[3]

The industry in the interest of which Mr. Wyman works is an old one in this country, going back nearly to the time of earliest settlement. It is unfamiliar, however, to many people living elsewhere than in the South. So Mr. Wyman begins his statement somewhat in the historical line. Rather more than most industries, it appears to him, the business of naval stores has been conducted on traditional lines, with low efficiency and extensive waste of raw material resulting. However, several foresters were at work in the field of naval stores investigations even earlier than Mr. Wyman, the industry itself has as he says been reasonably open-minded toward reform, and so for a number of decades now things have been progressing.

The study itself is detailed and technical. In order to appreciate it one has to understand the method by which raw gum is got out of the tree. Mechanically the process of producing gum is the following: A clay or metal cup is hung at the base of the tree to be worked and strips of metal are so fixed above the cup as to lead the gum into it; then, beginning as close above this installation as possible, the tree is cut across the grain, with a special tool called a "hack." To this wounding the tree responds with a flow of gum. The wound is repeated weekly, each successive cut being made just above the last. At three or four week intervals the cups are emptied and the gum obtained is transported to a central point for stilling.

It is with the economics of this operation and with its relation to the tree's health and sustained yield that Mr. Wyman has been dealing. His plan has been to work trees in groups of 50 or more each, regulating the work done accurately, weighing the yield of gum by groups, finally making comparisons.

Some things that might be inferred at once nevertheless needed proof and quantitative determination. In the first place, Mr. Wyman has found that yield gains fast with added size in the trees worked. He correlates specific yields with specific sizes. Further, he infers that vast numbers of trees commercially worked are unprofitable. A tree's environment, too, affects its yield; open standing trees with generous crowns yield significantly more than trees of the same diameter that are crowded. Individual variation in yield is another thing that has come out. Of two trees of the same size that look alike and stand in similar

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[3] Experiments in Naval Stores Practice. 60 pp., illus. 1932.

relations, one may yield two to four times
the other. Microscopic study has not de
structural ground for such individual di
fact, of course, takes the work out of t
matical or mechanical class, callin
tests with large numbers of trees
averages.

Mr. Wyman has carried o
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commeme extent been going
along

od of Calculating Volumes

, United States Forest Service

teresting method of computing
ted in a recent bulletin of the
tière of Belgium.[4] It is based
of calculus, that "the volume of
volving a plane figure about one
the product of the area of that
ference of a circle described by
y." This is expressed by the

olume $=\pi 2ra$

416, r is the radius of the circle
ter of gravity, and a is the area
be revolved about the axis. The
possibility of obtaining the exact
s (a and r) in this equation, and
their value. The area (a) is ob-
the equally spaced radii and mul-
ance between them. The radius
viding the sum of the radii by the
ents.

hese approximations depends upon
ee and the distance between radii.
radius (r) is biased. It is always
e value. To offset this bias 3 is
The formula used by the author

ee volumes when diameter measure-
a at 1-meter intervals is:

$$V=3\frac{\Sigma d}{2}\times\frac{Md}{2}$$

d represents the sum of the diameters and Md
ean diameter. The volumes of 15 trees were
ulated by this method and by cubing each section.
he average deviation of these volumes was 2.59 per
cent.

For rough work this formula undoubtedly will prove satisfactory. However, the practice in the United States of measuring diameters in inches and length in feet makes it necessary to add a converting factor to the equation. Also, as it is impossible from a practical standpoint to take measurements at 1-foot intervals, a term representing the distance between radii must be added. The equation may now be rewritten as follows:

$$\text{Volume}=\frac{\Sigma d}{2}\times\frac{Md}{2}\times L\times K=\tfrac{3}{4}\Sigma d\times Md\times L\times K$$

where Σd represents the sum of the diameters measured, Md the average diameter, L the length of interval between diameter measurements in feet, and K a converting factor $\left(\frac{1}{144}\right)$.

It might be well to add that this method is only applicable where the diameter measurements are uniformly spaced.

Effects of the Drought of 1931–32 on Southern Pine

By W. R. Mattoon, United States Forest Service

A clear, full statement by Austin Cary, logging engineer of the United States Forest Service, analyzing his observations on the effects of the severe drought from June, 1931, to May, 1932, upon longleaf and slash pines in southern Georgia and northern Florida, has been published in serial form in the Naval Stores Review.[5] Doctor Cary has had 14 years' experience in the southern pine region. His study of the direct and secondary effects of a severe drought on turpentine stands of longleaf and slash pines is probably the most thorough, critical, and helpful yet made.

The drought of 1931–32 was of 12 months' duration. Its effects upon living timber began in earnest by September, 1931, and the year ended with a deficiency in rainfall up to 20 inches. Stream flow became increasingly light and ponds dried out during the early fall. Only two periods of slight relief occurred—in December, 1931, and in March, 1932. The first turn from the mounting deficiency in rainfall began on May 18, 1932; June rains were abundant in some places, spotty

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useful data are given,
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[4] vo Metodo di Calcolo del Volume degli Alberi
liuo Mathiesen). L'Alpe, June, 1932, pp. 171-
in Bulletin de la Société Centrale Forestière
2, pp. 438–445.

[5] Cary, Austin: On the Recent Drought and Its Effects. Naval Stores Review, July 23, 1932, pp. 14-15; July 30, 1932, pp. 14-15, 20; **August 6, 1932, pp. 14–15, 18–19.**

: Lumber Used in
graphed.

in others. By way of comparison, Doctor Cary refers briefly to the drought of 1913 and in detail to the severe one of 1924–25, when great numbers of trees died directly or through insect attack and the turpentine business was practically suspended.

General observations were made over an area of about 10,000,000 acres in southeastern Georgia and northeastern Florida. The essential elements of the drought situation throughout this region are summed up by Doctor Cary as follows: Lack of normal rainfall results in severe drying of the upper soil layers, which lowers the ability of the trees to get sustenance; imperfectly nourished trees grow at a slower rate, yield less than normal amounts of resin, become subject to "dry facing," and attract destructive insects; number and severity of fires are increased by dry weather.

An intensive study was made in Columbia County, in northeastern Florida, on an area of about 5 by 6 miles in extent, selected as typical of the region. Here, as early as August, 1931, numerous longleaf pines which were being turpentined were seen to be in bad condition, but the operators continued working them on the supposition of rains coming soon. At least three-fourths of the subsequent heavy losses of trees, it is believed, could have been prevented by stopping work in August. Ips beetles girdled the weakened trees and spread very rapidly. Trees died within a few weeks after being attacked. By December, 1931, 75 per cent of the timber on many small areas was dead. The insect attack received a slight check through the light rains which occurred in January. The trees affected were mostly open-grown, thrifty longleaf pines. Some round (uncupped) timber died, but it suffered far less than timber that was being worked. After heavy losses in midwinter additional trees died during the spring from insect attacks. Forests in normal health are seldom attacked so extensively and with such heavy losses as were the trees in this area. The normal flow of resin in healthy trees is generally sufficient to drown the attacking insects. In this case drought and fire combined with turpentining caused the forests to be ravaged. The fact that this region is underlain with a porous or spongy form of limestone favorable to extreme drying out of the soil no doubt aggravated the drought conditions.

Similar close studies were made from time to time in several other localities with a view of determining so far as possible the cause of losses of living timber. In Charlton County, Ga., just east of the Okeefenokee swamp, patches of dead timber were found coexistent with underlying deep and very dry soils, while living timber close by was on lands with better subsurface conditions, either of organic matter or sand and clay layers which stored up and held moisture. In Clinch County, Ga., losses were heavy in a body of larger and older slash pine being worked heavily for the third time. Another similar body of timber that began to die in August, 1931, and also was badly infested with Ips beetles, grew on land underlain with a clay that became stony hard when dry. This turned the roots and held no store of moisture for times of need. In Alachua County, Fla., a working in slash pine showed bad faces and yellowing tree tops by October, 1931. This should have been sufficient warning for stopping turpentine operations. The timber in bays, mostly slash, suffered worse from dry facing than the longleaf growing on slightly higher ground. The working by this owner was conservative in all points but one, the cutting of extra streaks to pay winter expenses. This is believed by Doctor Cary to have been the last straw that caused the losses. Rains in March, 1932, although light, caused a prompt and well-marked freshening up of the faces. A good many million feet of longleaf and slash in Dixie, Jefferson, and Taylor Counties, Fla., died because of the ravages of fire in the midst of the drought.

The losses of timber from drought in general show a fairly close relation to the kind of turpentine working practiced. Round, or unbled, timber appears not to have died in any quantity. Timber that was virgin (or first worked) in 1931 suffered relatively lightly, though it did dry face to a considerable extent and the drying out usually went up the trunk above the face.

Timber being worked for the fourth year and worked-out timber ready for the sawmill suffered heavy losses up to a maximum of 70 per cent of all trees on one half-section (320 acres).

The losses of timber by death due directly to drought in practically all cases were closely correlated with underlying soil conditions, especially the composition (whether sand or clay), the depth and arrangement of soil layers, and the capacity of the soil for acting as a reservoir. Drought is far-reaching in its effects on soil. It not only deprives the surface layers of their moisture but if prolonged it depletes also the lower reserve supplies from which the upper layers are in ordinary times replenished by natural processes. Drought in summer is likely to have far more serious effects than at other seasons because the soil moisture evaporates faster and the rate of transpiration by trees is greatly increased.

In general, testimony shows that moderately dry years are favorable to increased naval stores production. In this drought yields fell off perceptibly, and, apparently contrary to previous experience in droughts, they fell off gradually rather than abruptly.

An unusual form of dry facing was observed which, so far as known, occurred extensively for the first time during this drought. It consists of a pitch soaking or drying of the wood under the bark of the tree and above the face. It was first noticed in Florida, where an operator was raising aprons on vigorous slash timber. The faces looked normal with a good covering of gum from last season, but when the new streak was cut the wood above the face was found to be dry, gum soaked, and nonyielding. This condition has since been observed in other places, quite extensively in some instances.

Fires were unusually prevalent and extremely severe due, of course, to drought conditions rendering the oods highly inflammable. Great numbers of good-zed trees were killed; many that did not die were corched and defoliated and their growth greatly tarded. An enormous quantity of pine reproduction as killed. Vast numbers of trees were put out of roduction; trees already affected by the drought were eakened and the way opened to insect attack. In ddition, fire burned up quantities of naval stores quipment.

Slash pine in bays and ponds on muck soil is particurly liable to total destruction by fire in very dry times, ecause the soil itself may feed the fire or burn out eeply and cause the uprooting of the trees. The point brought out in the articles that the feeding roots of e tree are near the surface and the burning of even e scurf of organic matter may serve to damage or ll the trees. The ability of longleaf to withstand the fect of fire, as compared with that of the other native nes, is commented on as a cheering reflection.

How long do the effects of drought persist in the uthern pine region? Specific references are made to oservations which point to the probability that for veral years to come and perhaps permanently the rowth rate of this severely scorched timber will be uch set back, and that serious infestations of insects ay set in months after the trees appear to have ecovered. Many scorched turpentine trees, however, hich were not worked too soon, recovered under rest d yielded good gum flows the next season.

Certainly the drought of 1931–32 has cost the South eavily in money values, running far up into millions. the opinion of some this portion of the South has een set back at least five years. It is undoubtedly ue that the loss to the naval stores industry would ave been vastly greater had not its members in the st 10 years greatly lightened and improved their yle of work. It seems not unlikely, in fact, that in e past year alone the industry has been repaid for l its effort and expenditure in this direction.

Utilization of Bigleaf Maple

By W. D. Brush, United States Forest Service

To date, the Forest Service has issued 10 bulletins vering the utilization of individual species and groups species of commercially important woods of the nited States. These species-utilization bulletins ntain information for the assistance of users in deterining the suitability of the wood for specific uses and r converting the timber to the best advantage into its rious products. These data are also of value to mber owners seeking markets and to others desiring neral information on the commercial importance, aracteristics, and uses of the various woods.

United States Department of Agriculture Circular 5, Utilization of Bigleaf Maple of the Pacific Northest, by H. M. Johnson, of the Forest Service, is a luable addition to this series. The principal topics covered by the publication are range, amounts used, properties, uses by industries, seasoning, lumbering, and transportation. Very useful data are given, including transportation costs and prices of stumpage, logs, and lumber. The sections on seasoning, methods of lumbering, and transportation are particularly worthy of commendation for the practical information presented. A considerable number of illustrations help to depict methods of utilization in an effective manner.

Bigleaf maple, with an annual cut of only 1 per cent of the total production of maple in the United States, reaches commercial importance only in the coastal region of Washington and Oregon, its natural range. It has much lower strength values than the common hard or sugar maple of the eastern United States, but because of the scarcity of hardwoods in the West it is important locally, being largely used in furniture and chair industries, the products of which were valued at $12,000,000 in 1927. Statistics show a large increase in the use of bigleaf maple from 1910 to 1928 (the last year for which data are given).

The future importance of bigleaf maple can not be judged because no estimate of the marketable supply is at present available, due in large part to the poor quality of many of the stands. The increased difficulty, mentioned in the circular, of obtaining ample supplies at market prices may indicate a probable future scarcity. Higher prices for logs might maintain or even increase the cut; on the other hand, increased costs might result in the substitution of eastern hardwoods, such as red gum. Increasing markets for furniture in the West combined with the scarcity of native hardwoods there may provide a greater future demand for this wood. The Census of Manufactures shows an increase in the total value of wooden household furniture manufactured in Washington and Oregon from approximately $9,000,000 in 1927 to $11,000,000 in 1929.

The amounts of bigleaf maple consumed by the various industries in 1928 in Washington and Oregon as given in this circular differ by about 10 per cent from those of maple used in manufacture in those two States in the Forest Service statistical study for the same year.[6] Figures on the production of bigleaf maple lumber in the bulletin are considerably greater than those shown in Bureau of the Census statistics; this is presumably due to the inclusion of the cut of numerous small hardwood mills in the two States not included in the Census figures.

One not familiar with the details of wood structure may have some difficulty in understanding the much-condensed discussion of the structure of bigleaf maple wood. This may be increased by the fact that one or two of the terms used in the illustrations do not agree with those in the text. For instance, "pores" are mentioned in the text but shown as "vessels" in the figures. "Wood fiber" in Plate 1 should be "wood fibers," and this term is not mentioned in the text at all. In the same plate, "width of annual rings" should be "width of annual ring" or perhaps better "annual ring"; it might also be of value to the reader to know the degree of magnification of the wood sections.

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[6] U. S. Department of Agriculture, Forest Service: Lumber Used in Manufacture, 1928 (Summary Tables). 1930. Lithographed.

This publication should be of much practical value to anyone interested in the hardwoods of the Pacific Northwest.

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Farmers' Bulletin 1177, Care and Improvement of the Farm Woods, by C. R. Tillotson (reprint). 5 cents.

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U S GOVERNMENT PRINTING OFFICE: 1932

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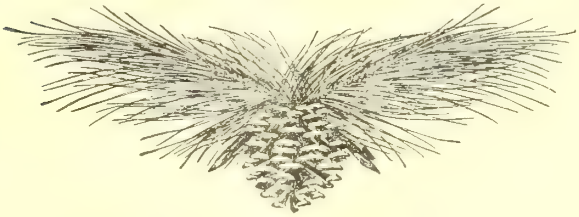

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Announcements

Meetings of New England and New York Foresters Scheduled

The New England section of the Society of American Foresters will hold its annual meeting in Manchester, N. H., February 6–7, 1933. The sessions will be held at the Hotel Carpenter.

The New York Section of the society will meet February 4, 1933, at Syracuse, N. Y.

February 3 has been set as the date of the annual meeting of the New York State Forestry Association at Rochester.

New Date Set for Marshall Memori Dedication

Dedication of the Louis Marshall memorial scie building at the New York State College of Fores Syracuse University, originally planned for Novem 18, 1932, and postponed, has been definitely set February 23, 1933. The program for the meeting being developed by Samuel N. Spring, assistant de of the college. The building will house the departme of silviculture, forest zoology, entomology, and bota and the Roosevelt Wild Life Experiment Station.

The Forest Worker is published by the Forest Service, United States Department of Agriculture, Washington, D. C. Julia H. Drown, acting editor. Material offered for publication in the Forest Worker should be addressed to the editor.

Because the free edition is necessarily limited, this periodical can be distributed without charge outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the Forest Worker can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

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State Forestry

lifornia Starts Second Winter's Work in Unemployment Camps

t least 7,000 jobless men from all over the country
be cared for during the winter of 1932–33 in Cali-
ia unemployment camps. Many of the camps will
ocated within or adjacent to national forests in the
thern part of the State where winter working con-
ons are better and where the greatest number of
mployed transients congregate. About 4,500 men
be cared for in camps supervised by members of
State division of forestry; camps accommodating
ut 2,500 will be under the supervision of officers
he United States Forest Service, with 100 to 300
in each camp. Opening of the camps was delayed
he prolonged fire season in southern California which
ired the continuance of the protection personnel
heir regular duties.

lthough $300,000 of the $400,000 provided by the
e for unemployment camps this year comes from
tax money and is available only for projects that
benefit the highway system, it is thought that this
ision will not interfere greatly with the develop-
t of a program highly beneficial to forest protec-
. The tremendous damage to highways following
particularly in the brush fields of southern Cali-
ia, justifies substantial expenditures from high-
funds for protection of the areas through which the
ls pass. Projects upon which gas-tax money will
spent are submitted to the State highway division
approval. The remaining $100,000 is from the
ernor's emergency fund and constitutes a special
ease of the firebreak appropriation in the State
ster's budget.

rest Work Important in Wisconsin Relief Program

lost of the labor employed by the Wisconsin Con-
ation Department under the State unemployment
f program, for which $500,000 was appropriated,
been used in the construction of fire roads and lanes
ugh forest-protection districts, the erection of
out towers, and other forest work. During the
first seven months of the program, 9,300 men were employed in 24 counties on 369 projects.

Cone collection enabled 225 other persons to earn $3,484.25, an average of about $15.50 each. The need of the conservation department for seed was increased by the enlargement of the Trout Lake nursery and the establishment of a new nursery. The cones were collected in the northern counties, 2,371 bushels bought by the department being white pine and 1,515 bushels Norway pine. Prices paid were 50 and 75 cents a bushel for white pine and $1.50 for Norway pine cones. Enough seed was obtained to fill the State's needs for several years.

New York Planting Program Analyzed at State Foresters' Meeting

W. G. Howard, superintendent of lands and forests of New York State, presented an analysis of his State's $20,000,000 reforestation program at a session of the annual meeting of the Association of State Foresters held in New Jersey, October 17–19, 1932. This program, explained Mr. Howard, is primarily for the reclamation of waste land rather than the acquisition of forested areas. It is concentrated in the central and south central parts of the State. Objects to be attained through the program were listed by him in the following order of importance: Watershed protection; development of public recreation and hunting grounds; production of timber; improvement in appearance of the countryside. The maximum price to be paid for land was first set at $3.50 per acre, but this was raised to $4. By October, 1932, 179,000 acres had been purchased at an average price of $3.87 per acre and 50,000,000 trees had been planted on 61,300 acres.

Some of the principal problems involved in such an extensive reforestation operation as New York has undertaken are, according to Mr. Howard: Obtaining sufficient supplies of tree seed; protection of areas from fire, tree diseases, and insects; production of a sufficient quantity of planting stock in nurseries. Species used for planting have been in the proportions of 32 per cent Norway spruce, 31 per cent Norway pine, 20 per cent white pine, and the remaining 17 per cent miscellaneous species including white spruce, white cedar, balsam, European larch, Japanese larch, black locust, white ash, and white and red oaks.

The meeting of the association took the form of a 3-day tour in busses through the principal forest regions of New Jersey with business sessions at Trenton, Atlantic City, and Newark. Forty-four foresters attended, representing 22 States, the American Forestry Association, and the United States Forest Service.

The Larch Case Bearer Menaces Maine Forests

By Robley W. Nash, Maine Forest Service

Since 1922, stands of larch throughout Maine have been severely injured by repeated attacks of the larch case bearer (*Coleophora laricella*). Complete defoliation is caused by this European insect and many trees have been killed. Infested trees have the appearance of having been scorched by fire.

The small, ash-gray moths, with a wing expanse of about three-eighths of an inch, appear about the first of July and lay their small, orange-colored eggs singly on the larch needles. The young larvæ tunnel directly into the needles and continue to mine until September when they cut off portions of the hollowed leaves and form cigar-shaped cases. They then migrate with their cases to the twigs, branches, and trunks of the trees, where they remain over winter. In the spring the larvæ push their bodies from the cases and crawl to the new needles, tunneling into them and hollowing them out. It is at this time of the year that the heaviest feeding is done. Though larch is the preferred host plant, larvæ have been found feeding on white pine and balsam fir trees which have been growing beside infested larches.

The larvæ prefer locations protected from winds. It has been observed that in attacking a tree the insects feed first on the foliage of the lower limbs.

Larch constitutes a considerable part of the Maine forests. The heartwood is very durable in contact with the soil. Larch wood is used for posts, ties, telephone poles, paving blocks, ship knees, tanks, silos, and refrigerators. It is one of the strongest and heaviest of our native softwoods, only longleaf pine being notably superior. Normally it grows to a large size, but repeated attacks of the case bearer and the larch saw-fly have retarded its growth in Maine to a large extent.

Defoliation by the larch case bearer has killed from 25 to 33 per cent of the larch trees in some sections of the State. It is feared that many of the trees still surviving will succumb with continued defoliations as heavy as those of the last few years. The growth at present is but 40 per cent of the normal rate. On sample plots, trees of other species have maintained a steady rate of growth or have increased the rate during the same period, which would indicate that the bearer alone is the cause of the retarded developme the larches.

To prevent widespread injury by this insect, i advisable under forest conditions to maintain m plantations. In some cases the pruning of the lo limbs when the attack is first starting will succee checking it. European foresters recommend the pl ing of larch in naturally well-drained places with c ful management to insure free circulation of air ab the trees. Such management is also advised European workers for prevention of the larch ca found a few years ago in Massachusetts.

Possibility of control by native parasites, in Main least, is very doubtful. Efforts to discover paras material have not yielded satisfactory results.

During the past year the Maine Forest Service tried different solutions of insecticides for the con of the case bearer. G. W. Herrick in a paper enti "The Larch Case-Bearer" [1] recommended the use lime-sulphur spray. This spray should be applied the late spring dormant season and, as recommen by Professor Herrick, should be diluted at the rate gallon to 8¼ gallons of water when the concentra solution tests 33° Baumé. Applications were m to test the different insecticides and especially to means of control which could be used in the sum

The first applications were made on May 18, 19 with the following percentages of insects killed by different solutions used:

Lead arsenate, 2 pounds to 100 gallons of water, per cent dead;
Nicotine sulphate (1–400) plus liquid potash s (1–600), 54 per cent dead;
Pyrethrum solution (1–400) plus liquid potash s (1–600), 83 per cent dead;
Nicotine sulphate (1–400) plus Pyrethrum solut (1–400) plus liquid potash soap (1–600), 90 cent dead.

The lead-arsenate spray caused considerable burn

Trees were sprayed on July 13, 1931, to see if e could not be killed along with newly hatched lar Hatched larvæ at this time were inside the needles not in cases as they were when the sprays were appl on May 18. Lead arsenate was tried again and ag caused severe burning. It was used in a 2–100 dilut plus raw linseed oil (1–800) and killed 4 per cent of eggs and 10 per cent of the larvæ treated. (Cou were taken after the eggs had hatched.) Pyreth solution (1–400) plus liquid potash soap (1–600) kil 20 per cent of the eggs and 10 per cent of the lar Nicotine sulphate (1–400) plus liquid potash s (1–600) killed 28 per cent of the eggs and 68 per c of the larvæ.

On November 5, 1931, dormant sprays of miscible were applied. Dilutions of 1 part oil to 30 parts

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[1] Cornell University Agricultural Experiment Station Bulletin 3 1912.

er gave less than 40 per cent control and hence were
satisfactory. Dilutions of 1 to 15 gave very satis-
ory control. In two applictions control percent-
s of 99.5 and 98.5 were obtained. Similar dormant
lications of the same oil made in the spring of 1932
e variable and unsatisfactory results.

Three Districts Added to Indiana Protection System

ndiana now has eight forest-fire districts, giving
tematic fire protection to 1,115,000 acres of State
privately owned forest land. Three of these are
districts established in the fall of 1932, each
ished with a new lookout tower.

n 80-foot steel tower overlooks the first new unit
00,000 acres of forest land in the "knob" region
Floyd, Harrison, and Clark Counties, one of the
st fire districts in the State. The second district's
er, 100 feet in height, is about 5 miles south of
li and overlooks about 75,000 acres in southern
nge and northern Crawford Counties. The tower
n 55 acres of land set apart for experimental and
onstration forest plantings. The third district has
80-foot tower situated in the Jackson County State
est with a range of 75,000 acres in Clark, Brown,
shington, and Lawrence Counties.

lifornia Still Free from Blister Rust

scouting tour of about two months, conducted by
Division of Blister Rust Control of the Bureau of
it Industry in the northern part of California and
the Sierra region as far south as the Stanislaus
ional Forest, revealed no signs of white pine blister
. Inspections were made on pine and Ribes at
tegic locations with reference to close association
the two hosts and sites favorable for the rust to
ke and spread.

t was feared that the disease would be found in the
thwestern corner of California bordering on Curry
inty, Oreg., where it has been active for several
rs, but its presence there still represents the south-
most point of its spread in the West. In the
cade Range it was found on the currant host 25
es farther south this year than last, or about 160
es north of the California line.

* * *

tract of about 23 acres has been presented to the
te of New Hampshire by W. B. Douglass, of Boston,
ss., and Wilmot, N. H. The land is on the westerly
e of Mount Kearsarge at the end of the public
l, nearly 1,900 feet above sea level, and furnishes
important approach to 1,360 acres of public forest
l on the upper slopes of the mountain.

Wisconsin Starts Work on New Nursery

A forest-tree nursery is being developed by the Wisconsin Conservation Department on 20 acres of land given to the State for the purpose by the Nekoosa-Edwards Paper Co. The tract is in Wood County, about 4 miles south of Wisconsin Rapids. Eight hundred seed beds, 4 by 8 feet and averaging 5,000 seedlings to a bed, were ready in the fall of 1932 for planting with white, Norway, and jack pines and Norway and white spruce. Additional beds to be established in the spring will bring the capacity of the nursery to 5,000,000 trees.

Seedlings from the 1932 fall sowing will be available for planting in the fall of 1934. After that it is expected that one half of the 10,000,000 seedlings called for annually by Wisconsin's program of planting on State forest lands will be produced in this nursery; the other half of the stock needed will be supplied by the Trout Lake State nursery, in the Northern State Forest in Vilas County.

Mississippi Protective Area Makes Good Fire Suppression Record

Although a greater number of fires occurred during the fiscal year 1932 in the Pascagoula Protection Area of Mississippi than were ever before recorded, the acreage burned, average size of fire, and estimated damage were the lowest on record, reports K. E. Kimball, District Forester. Fire crews answered 1,078 alarms and fought 731 fires which burned 13.1 per cent of the 400,000-acre area. The average fire burned 71.7 acres. The majority of fires occurred between February 15 and April 9, 1932, of which 93 per cent were of incendiary origin. The average total elapsed time between discovery and control of a fire was 2 hours 19 minutes 18 seconds, of which 1 hour 41 minutes 28 seconds was control time; only 37 minutes 50 seconds elapsed between the start of the fire and arrival of the crew.

* * *

South Carolina added three new fire-protection associations, averaging 33,000 acres each, to its protective system during the past year. One of the areas is in the coastal-plain region of the State, one in the sand hills, and the third in the mountainous section. Four fire towers are in use by the new associations.

* * *

An entire floor of the new administration building of the Texas A. and M. College, which is now under construction at College Station, Tex., and is expected to be completed in October, 1933, has been assigned to the Texas Forest Service.

Blister Rust Control Record in Pennsylvania

During 1932 the Pennsylvania Department of Forests and Waters in cooperation with the Bureau of Plant Industry protected 121 areas from blister rust through the cooperation of private owners and carried on 100 projects without assistance from the owners. In addition, work was done on 31 areas in State forests by the personnel of the State forest districts.

On 20,007 acres, 720,952 wild Ribes plants and 3,342 cultivated Ribes were removed and destroyed, protecting 2,266 acres of white pine from blister rust. In addition, 57,059 wild and 7 cultivated Ribes were removed in the reexamination of 38 areas containing 2,428 acres, of which 925 acres were of white pine. A total of 22,435 acres was examined, and 778,011 wild and 3,349 cultivated Ribes plants were destroyed during the season.

In cooperation with the Pennsylvania Department of Welfare, 2,055 wild and 52 cultivated Ribes plants were removed from lands adjacent to the forest nursery at Rockview. Reexamination of the sanitation zones at the four State forest nurseries resulted in the removal of 2,215 wild Ribes.

Adding the 1932 control results to previous years' records shows that Pennsylvania has, to date, covered in initial eradication 60,766 acres and destroyed 2,621,785 Ribes plants, and in follow-up work protected 5,016 acres. Initial work has been completed on State-owned lands in almost half the State forest districts. On privately owned lands the initial work is practically completed in four counties and has been started in four additional counties.

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An arboretum has been established at Washington Crossing Park, N. J., through the generosity of Charles Lathrop Pack. It contains practically all of the trees and many of the shrubs native to New Jersey and will be known as the George Washington Memorial Arboretum.

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A pound of red alder seed has been obtained by H. A. Smith, State forester of South Carolina, to be planted experimentally in the South Carolina State nurseries. This species has been of some use in Oregon in halting fires, according to J. B. Woods, forester of the Long-Bell Lumber Co. Its so-called fireproof quality is due to the fact that its broad leaves do not contain pitch and are therefore less inflammable than the needles of coniferous trees. The value of red alder for planting in firebreaks is being tested by the United States Forest Service in the Pacific Northwest region, but present indications are that its usefulness will be limited. It is doubtful, says Mr. Smith, whether red alder seedlings will stand the hot South Carolina su mer. Even if the species will grow successfully the South, it will be some time before its usefuln for firebreaks in that region can be determined.

Relief Work in Pennsylvania State Forests

Thirty-seven local relief projects, giving emplo ment to about 400 men, are under way in the Sta forests of Pennsylvania. Various plans for furnishi employment and free fuel wood to those in need ha been worked out by the district foresters in coope tion with local welfare agencies. Dead and fi scarred trees are being removed from the woods, Stat forest boundary lines and areas intended for roads a being cleared, and park areas are being improved.

New Protective Organizations in Georg

Two new forest-protective associations have be formed in Georgia, one as a Timber Protective Orga zation with 11,946 acres of forest land listed and t other as a Forest Fire Fighters' unit with 603 acres. T larger organization is in Pierce County. The memb of the other group are 11 negro property owners Stewart County, who were organized for protection their forest land from fire through the efforts of H. Hall, vocational agricultural teacher at Omaha, Ga.

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Kershaw County, S. C., is the only county in t State and one of the very few in the United States employ a full-time forester. Charles W. Nuite, w holds that position, occupies a joint office with t county agent, H. D. Green, an arrangement whi contributes to effective cooperation with the Sta Extension Service. There are about 61,000 acres actual and 2,000 acres of potential forest land und organized fire protection in Kershaw County, o about 2 per cent of which was burned over during t last 11-month period for which records are availab Slightly more than 50 per cent of all forest-tree seedlin planted in South Carolina last year were planted Kershaw County, where 267,550 seedlings were set ou

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Including a recent addition of 2,822 acres to the Ba River State Forest, New Jersey now has eight Stat forests containing 48,143 acres of land acquired at a average cost of $5.85 per acre.

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New York State tree nurseries will be growing mo than 100,000,000 forest trees annually by 1936, it predicted.

Education and Extension

e of Pulpwood a Source of Cash to Louisiana Farmers

By ROBERT MOORE, Extension Forester, Louisiana

ince 1930, farmers in Louisiana have been forced to
plement the returns from their regular operations,
pulpwood has offered a ready and obvious resource
ch is quickly converted into cash. Data on pulp-
d purchases by Louisiana pulp and paper mills
ected for the three years 1929–1931 show that the
cultural depression, the low price of farm products,
the drop in price of pulpwood have not halted but,
he contrary, have stimulated the cutting of farm
timber.

1929 the seven mills in Louisiana paid in cash
50,600 to farmers, either directly or through
ractors who purchased directly from the farmers.
owood was bought in 16 of the 64 parishes of the
e. In 1930, although one mill closed down during
year, the purchases from farmers dropped to
59,863, a relatively insignificant decrease com-
d to the drop in the returns from other farm
lucts. During 1931 total cash receipts suffered a
her decline to $1,452,928. However, for the mills
peration during both 1930 and 1931, the cash
enditure for pulpwood in the latter year actually
eased over that in 1930 by approximately $4,000.
he Louisiana pulp mills, recognizing the financial
lition of the farmers, in many cases increased their
hases, having suspended cutting in their own
er. One concern gave preference to farmers who
certified by the county agricultural agents as
g in particular need of money. This plan seemed
meet with general approval. The same mill
eased its purchases in 1931 by almost 10,000 cords,
e another mill doubled its purchases. In fact,
one mill decreased the quantity of pulp bought
farmers in spite of the slump in the paper business.
he deepening of the depression was reflected in
ges in both price per cord and in the size of the
. In 1929 practically all purchases were on the
s of the standard cord of 4 feet by 4 feet by 8 feet,
the price was uniform at $5 per cord. In 1930
reduction was the policy. The price went as low
4.48 at one mill, and only two mills maintained
1929 scale of prices. In 1931 price cuts became a
us factor in the pulpwood situation. One mill
ped the price to $3.25 per standard cord, another
4.50 and then to $4. Late in the year this latter
after a conference with some of the principal
ers of the area, decided to add 6 inches to the
th of the stick instead of lowering the price again.
This was equivalent to a 12½ per cent cut in price. The mill buys from 80,000 to 90,000 cords per year.

Though such prices for pulpwood as quoted seem ridiculously low, they compare favorably with prices now received for other farm products. Cotton sold for 19 cents a pound in 1929 and for 6 cents in 1931. Eggs dropped from 36 cents a dozen to 23 cents, and then to 10 cents, butterfat from 35 to 26 cents per pound. The Bureau of Agricultural Economics price index shows all farm products at 138 in 1929 and 86 in 1931. In the light of these reductions, the decrease in pulpwood prices does not seem excessive. Farmers were and are anxious to cut and sell pulpwood almost without regard to profit, so great is their need for cash income. As one farmer put it, "If we can sell pulp timber it will beat Government help."

Tree-Planting Aids in Control of Michigan Sand Dune

Shifting of the sand of a huge dune at Saugatuck, Mich., which was encroaching on the channel of the Kalamazoo River and threatening property near its base, has been definitely stopped through plantings of trees with brush spread between the rows. No further trouble is expected from moving sand.

The dune, known as Old Baldhead Mountain, is 300 feet high and covers 4 acres. R. F. Kroodsma, extension forester of Michigan, was called in by the city for advice on controlling the sand, and on his recommendation planting was begun in April, 1931. Seedlings of black locust, honey locust, ponderosa, white, Norway, jack, and pitch pines, and large cuttings of willow and poplar were used. Carloads of brush were hauled up by cable and spread over the sand between the trees. Additional planting was done in the spring of 1932. There has been a splendid survival of the planted trees and considerable natural weed growth has come in over the dune. The mat of brush stopped the shifting of the sand and the growth of the trees and weeds is expected to make fixation permanent.

* * *

Fifteen hundred vocational agricultural students in South Carolina are studying forestry and practicing it upon some 60 demonstration forests in the State. County farm demonstrations of firebreak construction, thinning, forest improvement, and tree planting are to be held in each county this winter in cooperation with the South Carolina extension service, and forestry exhibits will be put on at 15 fairs.

Oratory Contests Effective as Fire Prevention Measure in Tennessee

By Tom B. W. Watkins, District Forester, Tennessee

A reduction in area burned in Fentress County, Tenn., from 3.03 per cent of the county's total area in the spring of 1928 to 1.7 per cent in the spring of 1932 is attributed by many of the large landowners of the county to the educational effectiveness of the three oratorical contests on the subject of forest-fire prevention held in the county schools in the last four years. Fire weather in the two seasons was practically identical.

Three hundred and sixty pupils of the seventh and eighth grades entered the 1932 contest and received special literature to assist them in preparing their talks on "What well-protected forests will mean to Fentress County." The finals were held at the Alvin C. York Agricultural Institute at Jamestown, and Coram Larue, of the Banner Springs School, was awarded the first prize of $10. Other prize winners were Clara Upchurch, of the Forbus School, $6; Rose Threet, Buffalo Cove School, $4; Christine Storie, Oak Grove School, $3; and Joe Wheeler, York Elementary School, $2. The judges were James O. Hazard, State forester, and Mr. and Mrs. W. T. Walton, of Rugby, Tenn. The cooperation of O. O. Frogge, superintendent of Fentress County schools, made possible the success of the contest.

Forestry Classes for Adults Introduced in Georgia Schools

Forestry classes for adults to be held at night in 20 to 30 vocational agricultural schools in Georgia are being inaugurated this winter. The classes will be conducted by the vocational teachers with the assistance of the district foresters. Subjects to be taught are reforestation, fire protection, thinning, wood utilization, and, in south Georgia, turpentining methods. If the work proves successful, it will be extended to all vocational agricultural schools in the State.

* * *

An intensive training course in practical forestry for Georgia boys who have demonstrated by their knowledge and accomplishments that they have a special interest in the subject is described in a pamphlet, "The Vocational Forestry Camp," prepared by Paul W. Chapman, Director of the Division of Vocational Education of Georgia, and issued by the division. This camp, held annually for a period of three weeks during July and August, is part of Georgia's "unique and practical method of teaching forestry to farm boys." The camp program of practical courses, field work, excursions, athletics, entertainments, and awards has been very successful and is described he in detail. Boys from vocational schools in eve county in the State who are most interested in forest compete for the privilege of attending the camp.

St. Lawrence University Establishes Ne Demonstration Forest

A third demonstration forest area has recently be established by the department of forestry of St. La rence University, Canton, N. Y. The tract consists 204 acres of typical abandoned farm land located b tween Mannsville and Sandy Creek, N. Y., on t main highway from Watertown to Syracuse. With frontage of half a mile on the westerly side of one the main roads leading into the Adirondack region, t forest is advantageously located for demonstrati purposes.

The primary object in the development of the tra will be to demonstrate the feasibility of the reforest tion of similar areas by private individuals, corporation and municipalities. Approximately 150,000 trees w be planted on open land on the tract next spring. A species adapted to the region will be used in the plantings, so that those contemplating similar projec will have an opportunity to observe the developme made by the trees in which they are most interested.

A 50-acre stand of mixed hemlock and hardwood typical of many northern New York farm woodlot will be improved to demonstrate ideal farm-woodl conditions.

A natural grove of white pine adjacent to the roa will be developed as a picnic ground. Roadways w be built through the tract to enable visitors to rea easily all points of interest.

Minnesota 4-H Club to Develop Arboretum

A 4-H forestry club group of 21 boys at Virgini Minn., is developing an arboretum on a tract of mo than 4 acres made available to it by the Daughte of the American Revolution. The project is under th direction of Parker Anderson, extension forester Minnesota. The area has been named the Georg Washington Bicentennial Arboretum at a dedicatio ceremony held October 24, 1932.

The tract is divided naturally into two parts—one grove of about 3 acres containing various tree specie and the other a small piece of wasted, rocky lan According to the club's plans, the larger part is to b used as an informal forestry demonstration area, which the stand will be thinned and the better tree encouraged. The formal arboretum will occupy th rocky land, which will be divided into about 40 sma plots where every species of tree native to the regio will be planted.

aho University Receives Experimental Forest

forest tract of 3,646 acres on Moscow Mountain, ah County, Idaho, presented to the University of ho by the Forest Development Co., was accepted the university by the State board of education on vember 13, 1932. The area is to be used as an erimental forest by the school of forestry of Idaho iversity, under the direction of Dean F. G. Miller.

n making the presentation, J. P. Weyerhaeuser, jr., whose interests the Forest Development Co. is a sidiary, described the forest as follows:

'The area is reasonably compact. All age classes of species of timber common to the northern part of ho are found on almost every possible exposure. e timber has only been partially removed and slash n logging operations has been handled in various nners with various results. All in all, we think there here, remarkably close to your campus, a forest oratory of very considerable educational value."

lp in Relief Projects Offered by New York State College in Bulletin

plan for unemployment relief through the use of woodlands of New York has been published by the w York State College of Forestry, Syracuse Uni- sity, in bulletin form. The cutting of fuel wood by se out of employment and the supplying of the wood eedy families throughout the State is suggested to yors of cities, county boards of supervisors, masters State granges, farm bureau agents, and woodland ers. The plan comprehends the donation or pur- se of forest areas and the harvesting of wood in a nner that will not only supply fuel but improve the d. Most of the woodlands of the State can be roved and their value increased by the removal of ective trees.

he college offers to furnish up to 100,000 young s under specified conditions at the rate of not more n 5,000 for any one project. The assistance of the stry staff in planning relief projects and in marking ple areas to guide the selection of trees to be cut is offered. The supervision of the actual operation, ever, must be taken care of by local agencies.

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entification of tree and plant species of southern ida for the benefit of the public has been under- n by the forestry and botany departments of the versity of Miami. A room in a university building been assigned to this identification service and ialists will be in attendance there from 3 to 4 p. m. y. Injured trees in the Miami area will also be inspected and treatments suggested. The work is part of the university's tropical research program.

Forestry-Demonstration Team Wins State Contest

By Charles A. Gillett, Extension Forester, Arkansas

A 4-H club demonstration team composed of Cecil and Curtis Davis of Redfield, Jefferson County, Ark., won the State championship demonstration contest held during farmers' week at the University of Arkansas with a demonstration on forest fire prevention. About 48 teams competed in the contest. The demonstration was seen by approximately 2,500 persons during farmers' week, and was also given before two luncheon clubs at Pine Bluff, Ark., and before a large group of farmers from Mississippi stopping over in that city.

The boys demonstrated the use of fire lines by means of a miniature forest on an inclined plane. A fire line was constructed through the middle of the little forest and a fire started on one side, which the fire line stopped. Equal amounts of water were then poured on the burned and unburned areas. The water immediately ran off the burned-over side, carrying with it an appreciable amount of soil, while on the unburned forest the water dripped off more slowly and carried no soil particles.

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Pennsylvania's first 4-H forestry clubs were organized in 1932 by Extension Forester F. T. Murphey and his assistant, W. I. Bull. Two clubs, having 28 and 17 members, respectively, were formed and began their first year's work, which consists of tree identification and collection of wood specimens and tree seed. For the second year the growing of seedling trees in home nurseries is scheduled.

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Prizes totaling $25 are being offered by J. S. Green, a naval-stores operator of Butler, Ga., to public-school students of Taylor County for the best essays on forestry. W. A. Lundy, the county agricultural agent, is planning the contest. Mr. Lundy is also expecting to assist landowners of the county to plant 100,000 trees on idle lands this spring.

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A well-equipped building of two stories, basement, and attic has recently been completed for use by the divisions of entomology and beneficial insect investigations of the southern branch of the University of California. Laboratories and offices occupy the main floors of the building, while in the attic is a greenhouse for growing plants and propagating insects.

Forest Service Notes

The Use of Fertilizers in the Forest Nursery

By J. H. Stoeckeler, United States Forest Service

Production of hardy, well-balanced stock at less cost per thousand trees should be the result of proper use of fertilizers in the forest-tree nursery. The following discussion of treatments that have been used successfully, the factors influencing their efficiency, and those to be considered in their use is based upon a study of the literature on the subject and of the answers to a questionnaire sent to a dozen of the leading commercial nurserymen in the United States.

In selecting a method of fertilization the nurseryman must consider first the effectiveness of the treatment in producing a plant which will survive adverse field conditions successfully. Then the item of cost must be balanced against the results obtained. The effect of the treatment in relation to the sustained productivity of the soil, the type and condition of the soil, the age of stock, and the species are other factors which must be taken into account in evaluating the efficacy of fertilization.

Which fertilizer will be most effective for a given nursery can not be definitely predicted, but certain principles have been established which will apply to all nursery practice. It has been generally conceded that bulky fertilizers containing considerable organic matter invariably produce excellent results. Among these are animal manures, raw humus or leaf mold, and compost. In many cases it has been found that liberal use of such materials as charcoal and sand have improved growth more than fertilizers which supplied only plant food. Soiling crops such as soy beans, cow peas, buckwheat, rye, and clover not only furnish plant food for succeeding nursery crops but also add large quantities of humus to the soil.

Complete or balanced chemical fertilizers have shown better results than those supplying only one plant-food element. By the term "complete fertilizer" is meant one which contains the three elements which are most likely to be deficient in the soil—nitrogen, phosphorus, and potassium. Calcium is a fourth element necessary for plant growth, but most soils have it available in amounts sufficient to supply coniferous nursery stock. Nitrogen is useful primarily in stimulating top growth, while phosphorus shows a marked effect on root growth. The effect of the addition of a fertilizer must be considered in relation to the elements which may be present or lacking in the soil.

Each nursery presents its own problem in connection with fertilization. Some soils lack only one element; in others there may be a deficiency in several. A fertilizer used successfully in one nursery may no prove of much value in another, even though growt conditions appear to be the same. A thorough physica and chemical analysis of the soil may be valuable i indicating what treatment is most likely to be successfu However, the only sure method of determining th kind and amount of fertilizer to be used is to exper ment with a number of them on a small scale to ascer tain which is most effective. As a criterion of success one may use field survival, total weight of the plan top-root ratio, or any other factor which may seem desirable.

A few of the many treatments which have yielde excellent results are listed below:

(1) A mixture of 600 pounds of superphosphate, 30 pounds of ammonium sulphate, and 300 pounds o muriate of potash per acre.

(2) For second-year seed beds: 4 ounces of nitro phoska dissolved in 3 gallons of water applied in th spring to 48 square feet of pine or spruce seed beds; si weeks later 3 ounces of urea applied in the sam manner.

(3) For second-year transplants: 1 pound of nitro phoska applied to 100 square feet of bed, and 1 poun of urea six weeks later.

(4) A mixture of 268 pounds of 15 per cent sodium nitrate, 178 pounds of 40 per cent potash, and 89 pounds of 17.5 basic slag per acre.

(5) Use of 30 pounds of sheep manure on 48 squar feet of seed bed.

(6) For spruces: 1 pound of dried blood and 2 pound of ground bone on 48 square feet of seed bed.

(7) For pines: 2 pounds of dried blood and 1 poun of bone meal per bed of 48 square feet.

(8) For 2–0 spruces: ½ to 1 pound of sodium nitrat as a top dressing to 48 square feet of seed bed.

(9) A 5–8–7 combination (ratio of nitrogen, phos phorus, and potash, respectively) at the rate of 1,20 to 4,000 pounds per acre.

(10) For conifers generally: 2 pounds of ammonium sulphate dissolved in 10 gallons of water to 30 squar feet of seed bed.

(11) Soiling crops in combination with a heavy appli cation of fertilizers. (Soybeans, cow peas, buckwheat rye, and clover have been used successfully.)

(12) Heavy treatments of well-rotted stable manure

(13) Stable manure or commercial fertilizer com posted with raw humus or peat treated with lime.

(14) Lime on very acid soils.

In applying fertilizers some important factors mus be kept in mind. The age of stock makes a differenc in the results obtained. Practically all investigator agree that first-year seedlings fail to show much re sponse to chemical fertilizers of any kind because these seedlings draw a considerable portion of their food from e cotyledons and any additional nutrients needed n be drawn as easily from unfertilized as from the her soil. Therefore, if seed beds are to be treated, very soluble fertilizer should not be applied the first ar because considerable loss by leaching will be in-rred. This is especially true of the highly soluble rogenous fertilizers on light sandy soils or those th a porous subsoil.

In regard to the time of application, authorities agree at highly soluble fertilizers are applied most advan-geously in the spring or early summer. If the treat-ent is made later, the stimulus tends to form soft owth late in the season, which lacks maturity and nsequently is susceptible to frost and drought and es not keep well in storage.

Conifers seem to be more sensitive to some types of tilizers than ordinary truck or field crops. There is ossibility of direct chemical injury or, indirectly, of reased susceptibility to disease. From a survey of st experience, it seems to be a relatively simple matter determine which fertilizers should be applied lightly even entirely avoided. For instance, most fresh nures should not be applied directly; they should be mposted with sand, raw humus, or peat treated with e. Well-rotted manures can be used safely.

Heavy applications of such fertilizers as dried blood, ne meal, sodium nitrate, and lime have in some tances caused an abnormal loss through damping off. ually the highly concentrated nitrogen carriers have sed the most serious losses. Such damage can be oided by using medium or light applications.

These same nitrogen carriers have in a few instances sed an undesirable top-heaviness. In most cases s was more than offset by the general superiority in e, color, vigor, and field survival of the fertilized es. Top-heaviness can be minimized by the use of a nplete or balanced fertilizer.

The excessive use of lime may cause damage by mping off because it provides a good medium for the gi to live in. Lime, however, is usually not neces-y in the forest nursery except on the more acid soils.

Water in connection with fertility experiments must carefully controlled because, other conditions being al, heavy watering causes a stimulation of growth, ticularly of the tops.

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By Executive proclamation of October 20, 1932, esident Hoover transferred to the Yellowstone Na-nal Park approximately 7,600 acres of land along Yellowstone River previously a part of the Gallatin tional Forest, Mont. This transfer was pursuant an act of Congress of May 26, 1926, authorizing the esident to add to the park certain lands in the State Montana referred to therein. The object is "the servation and protection of the wild game" of whose nter range the area is an important part.

Osceola Forest Records Show Cost of Thinning Longleaf Pine

By JAMES G. OSBORNE, United States Forest Service

Records of a timber-thinning operation carried out in February, 1932, on the Osceola National Forest, Fla., give turpentine operators a definite basis for estimating how much it will cost them to thin young stands of second-growth longleaf pine. Many operators have known for years the advantages of thinning such stands, but until recently they have had very little information as to the cost involved.

Because trees in crowded stands compete with each other for soil moisture and for light, they can not grow so fast as if they were allowed more space. From tests carried out by foresters and from experience, turpentine operators know that the faster-growing trees produce the greater yields of gum and that a tree's capacity for producing gum increases as the tree increases in size. They recognize, also, that if a pine stand is thinned at an early age it reaches turpentining size from 10 to 15 years sooner, and that this means earlier returns on investment.

The turpentine operator is in a particularly good position to thin timber economically. Turpentining is a seasonal operation; usually the work is confined almost entirely to the nine months March to November. The winter months, fortunately, are the season when thinning can be carried out with greatest benefit to the trees. In addition, the turpentine operator has a continuous need of still wood, which can be met in part with thinnings. (It is possible that a new market for thinnings will soon be created by the advent of pulp and paper mills in the South.)

Thinning costs divide readily into overhead and labor costs. The former, representing transportation, tools and supplies, supervision, and the time spent by the operator in planning, may be considered as fixed, since they do not vary with the character of the stands to be thinned. These costs depend to a large extent upon the character of the available transportation facilities, the distance of the stands from the camp, and the availability of tools and of foremen who must be retained regardless of the quantity of out-of-season work. Labor costs, on the other hand, vary considerably with the character of the stands thinned. The data on thinning costs that were taken on the Osceola National Forest, by foresters of the Southern Forest Experiment Station, do not merely show the labor cost of thinning on the average acre, but show how much time of laborers was spent on each part of the thinning operation. They thus provide a basis for cost computation that does not fluctuate noticeably between regions and that is independent of local wage differences.

The thinning operation studied reduced the stand per acre to 200 trees. The largest and in general the best-formed and most evenly spaced trees were chosen to be left standing. No tree more than 6 inches in diameter was cut.

The longleaf pine stands on the study areas were of two age classes, 25 years and 35 years. For the 25-year-old stand the data were taken on an area basis, on six 1-acre plots. Records covered diameters of trees cut, number of trees per acre, chopping time, "other than chopping" time (including time required for planning and for walking between trees), and total time. For the 35-year-old stands the chopping time and diameters only were recorded, no plots being established. Data were collected on about 2,000 trees in the 25-year-old stands and about 1,500 trees in the 35-year age class.

Chopping time per tree was found to increase rapidly with size of tree, but varied considerably within each diameter class. The mass of the data, however, was sufficient to make the average figure for each class reliable.

It was found that on the average the time required for felling a 4-inch tree 35 years old was approximately one and one-half times as great as that required for felling a 25-year-old tree of the same size. A tree 1 inch in diameter required 1.11 seconds to fell in the 25-year-old stand and 1.33 seconds in the 35-year-old stand; a 2-inch tree, 1.975 and 3.046 seconds, in the two stands, respectively; a 3-inch tree, 7.28 and 10.65 seconds; a 4-inch tree, 14.40 and 22.25 seconds; a 5-inch tree, 22.44 and 35.75 seconds; and a 5.75-inch tree, 28.73 and 41.36 seconds in the 25-year-old and 35-year-old stands, respectively.

The fact that more time was required to chop the 35-year-old trees was attributed to the closer grain and greater hardness of the wood of these older trees, which had grown more slowly than the trees of the 25-year-old stand.

Average chopping time per tree corresponded rather closely with average diameter of the trees cut, within each age class, and was wholly independent of the number of trees removed per acre. These facts are brought out by data presented in the following table, representing four plots:

Number of trees removed per acre	Total time required to thin acre	Average diameter of trees cut	Average chopping time per tree
	H. m. s.	*Inches*	*Seconds*
883	4 13 28	2.59	7.02
390	1 25 15	2.05	3.82
431	1 33 44	2.58	7.07
222	47 10	2.38	6.36

"Other than chopping" time, also, was found to be independent of the number of trees removed per acre. It would seem natural that on plots where the number of trees per acre was greater, chopping should require more time and walking should require less; but this reasoning was not supported by the data. Data for four plots show that "other than chopping" time was greatest on the densest acre and least on the acre ranking second in density. The figures are: 883 tre removed per acre, 10.2 seconds per tree; 390 trees, 9 seconds; 431 trees, 6 seconds; and 222 trees, 6. seconds. The average "other than chopping" tim per tree for the four plots was 8.64 seconds.

The labor costs per acre for thinning the 25-year-ol stand, with wages $1 per 8-hour day, were as follow 200 trees removed per acre, 10 cents; 400 trees, 1 cents; 600 trees, 28 cents; 800 trees, 43 cents; and 1,00 trees, 68 cents. These cost data represent six 1-ac plots. (The costs were read from a curve of total tim per acre over number of trees removed per acre The figures are necessarily dependent upon the diamete distribution in the stands studied and hence can not b applied universally. A good estimate of thinnin costs for any second-growth longleaf pine stand can b obtained by cruising the area and applying the ave ages for chopping time per tree together with th average figure for "other than chopping" time, or 8.6 seconds.

Experiments Revive Hope for Broadcas Seeding

Direct seeding with forest-tree seed, in spite of history of repeated failures in the United States, ma have possibilities of success here under certain conditions. Seeding has the advantages of making possibl a much more flexible reforestation program and o allowing a natural development of the root system o the trees from the start. The method has been use successfully for many years with conifers in Euop and to some extent in Canada.

Experiments with direct seeding under way on th Olympic National Forest, Wash., in cooperation wit the Pacific Northwest Forest Experiment Station ar producing some surprising results. Sample areas on 1928 burn were seeded in January, 1929, by L. A Isaac, using 1.6 pounds of Sitka spruce, western re cedar, and western hemlock in mixture. In 1932 thes had an average stand of 2,800 seedlings per acr Parts of the same burn seeded in January, 1930, wit 2.24 pounds of mixed seed per acre now show 1,90 seedlings per acre. The results of the January, 1931 and January, 1932, seedings on the same burn wer very much poorer and did not produce satisfactor restocking on most plots. However, 1931 seeding on fresh burn at the rate of 2.4 pounds per acre produced 1,800 seedlings, and the 1932 seeding on a new bur shows an even larger number. Another recent burn o moist ground seeded to red alder in January, 1932, now has 13,600 seedlings to the acre, and an adjoining gravel-surfaced abandoned roadway has 25,000.

These results seem to indicate that adequate restocking can be obtained in the northwestern fog belt by seeding the first or second year after a fire with 1.5 to 2.5 pounds of seed per acre of small-seeded species.

On the Chippewa National Forest, Minn., the Lake States Forest Experiment Station also has been carrying direct seeding experiments in the past few years. rdly L. Shirley, of the station, believes that these eriments have yielded information that may lead the development of successful methods. Since most he work has been done in the last two seasons, which re unusually dry, equal or greater success may be sonably expected under more favorable conditions.

Seeding in prepared spots was tried out on the Chipva Forest in aspen, brush, grass, and jack pine er types, with seed of Norway, white, and jack es, and white spruce. The aspen sites proved to be st favorable. Even where seedlings came in, the t season's growth was poor and only an occasional survived the winter. The competition of the shy and herbaceous understory in aspen stands is inarily too severe for either seeding or planting to be cessful. The results on brush lands were slightly ter, but here also competition was too keen for isfactory growth. In the grass and sedge type the dlings have abundant light but are subjected to t competition and to the drying and heating effect direct sunlight. Yet, in spite of the drought, more n 20 per cent of the spots in this type contained dlings. Compared with 50 per cent survival of 1–1 rway pine stock planted in the spring of 1931 on wed land, this result is not so discouraging. Best ults were obtained in jack pine, where there was plant competition.

f the four species tried, jack pine proved most cessful, due in part to the small size of the seed ich enables it to escape the attention of seed-eating ds and rodents. Of 312 spots screened against birds rodents, 63 per cent had seedlings, whereas only 19 cent of 2,648 unprotected spots were occupied. ating the seeds or spraying the spots with repellents not afford protection, nor did the distribution of soned bait prevent the destruction of seed.

The work in Minnesota thus far indicates that direct ding may have useful possibilities in the Lake States reas to be seeded and species to be sown are carey selected and the seed protected from birds and ents.

hite Pine Stumpage Prices in the Northeast in 1931

By Henry B. Steer, United States Forest Service

ata on northern white pine stumpage prices for the endar year 1931, obtained through the cooperation the division of manufactures of the Bureau of the sus, have been compiled by the division of forest nomics of the Forest Service in continuation of a ilar compilation for the years 1926–1930, given in November, 1931, issue of the Forest Worker. obtain as complete reports as possible in view of the sual business conditions prevailing in 1931, the vass of the Bureau of the Census was augmented by uests for reports from a carefully prepared mailing list of several hundred known owners or buyers of New England stumpage. Averages are based on replies received from a total of 409 firms or individuals, involving 123 transactions and more than 35 million board feet of white pine stumpage.

Only about half as much white pine stumpage was reported sold in 1931 as in 1930. Many of the firms and individuals reported that they had bought or sold no timber during the year. While a few sales of virgin timber were reported, by far the greater part of the timber involved was second growth.

Prices of all white-pine stumpage reported sold in New England and New York in 1931 in pure stands or in mixed stands in which it was treated as an individual species are given in the following table:

State	Number of transactions	Volume of stumpage sold (1,000 board feet)	Value	Average price per 1,000 board feet	Price range
Connecticut	3	885	$4,175	$4.72	$4.00– 6.00
Maine	30	15,406	111,800	7.26	3.50–14.00
Massachusetts	36	6,391	47,581	7.45	2.50–11.10
New Hampshire	39	11,705	64,774	5.88	2.00– 9.75
New York	7	446	3,507	7.86	4.50–15.00
Rhode Island	2	501	2,508	5.01	4.00– 8.00
Vermont	6	216	2,079	9.63	6.00–12.00
Total and average	123	35,550	236,424	6.65	2.00–15.00

Following is an analysis of 1931 sales by price-range classes:

Price-range class	Number of transactions	Volume of stumpage sold (1,000 board feet)	Value	Average price per 1,000 board feet	Percentage of total number of reports	Percentage of total volume reported sold	
						1931	1930
$2.00–$2.99	2	275	$675	$2.45	2	1	(1)
$3.00–$3.99	6	2,395	7,894	3.30	5	7	2
$4.00–$4.99	15	3,463	14,214	4.10	12	10	3
$5.00–$7.49	48	17,015	104,352	6.13	39	48	30
$7.50–$9.99	41	10,728	91,226	8.50	33	30	16
$10.00–$14.99	10	1,669	17,988	10.78	8	4	46
$15.00–$19.99	1	5	75	15.00	1	(1)	3
Total and average	123	35,550	236,424	6.65	100	100	100

[1] Less than one-half of 1 per cent.

Reports of a few sales of white-pine stumpage in New England for less than $4 per thousand board feet were made in 1931, but such sales formed only a small percentage of the total number; 82 per cent by volume of the white pine was sold at prices greater than $5 per thousand feet.

The decline in white-pine stumpage values during the past three years has not, in fact, been as severe as that in prices of most other commodities. This is indicated by the following comparison between stumpage prices of white pine in New England and the average wholesale prices of all farm products, of hides and skins for tanning, of cotton textiles, and the purchasing power of the dollar, as compiled by the Bureau of Labor Statistics of the United States Department of Labor,[2] on the basis of 1926 values as 100 per cent:

Year	White pine stumpage prices	Wholesale prices of all farm products	Wholesale prices of hides and skins	Wholesale prices of cotton textiles	Purchasing power of the dollar
1926	100.0	100.0	100.0	100.0	100.0
1927	108.7	99.4	120.4	97.9	104.8
1928	107.1	105.9	148.6	101.2	102.4
1929	90.3	104.9	112.7	99.4	103.6
1930	95.4	88.3	91.0	87.4	115.9
1931	76.2	64.8	60.2	71.3	140.6

Latest Additions to List of Primitive Areas

With the approval in October, 1932, of eight additional tracts as primitive areas, the total number of such areas set apart within the national forests to be preserved in their natural wild state so far as possible becomes 54. A total area of 9,018,298 acres of national forest land and 221,107 acres of other land is now contained within these tracts. Logging is limited in all these wilderness regions, the timber in some of them being inaccessible for commercial use though valuable for watershed protection.

The most recently designated primitive areas are as follows:

Galiuro Primitive Area, Crook National Forest, Ariz., 50,200 acres.

Mount Baldy, Apache National Forest, Ariz., 7,400 acres.

La Garita-Sheep Mountain, Cochetopa Nation Forest, Colo., 38,030 acres.

Wilson Mountains, Montezuma National Fore Colo., 27,347 acres.

San Juan, San Juan National Forest, Colo., 238,0 acres.

Beartooth, Custer and Absaroka National Forest Mont., 230,000 acres.

North Absaroka, Shoshone National Forest, Wyo 379,460 acres.

South Absaroka, Shoshone National Forest, Wyo 613,708 acres.

Southern Hardwood Lumber to b Studied by Laboratory

A program of research in southern hardwood lumbe has been undertaken by the Forest Products Laboratory of the United States Forest Service. Requests fo such a study were made by the Hardwood Manufacturers' Institute and the Memphis Lumbermen' Club.

The four chief aims of the study are: (1) To provid consuming industries with specific information on working and machining characteristics of the differen southern hardwood species; (2) to find out whethe there is any better way of seasoning hardwoods tha that now used, particularly in the case of oak; (3) t determine the dividing line in size and grade betwee logs that pay their own way in logging and millin under typical southern hardwood conditions and thos that do not; and (4) to determine whether the properties of the more variable woods are governed principally by the growth conditions surrounding th individual tree or by the characteristics of the specie as a whole.

General Forest News

How Old is a Longleaf Pine?

By L. J. Pessin, United States Forest Service

Foresters working in the South have made many vain attempts to determine the age of individual longleaf pines in the seedling and later stages. Whereas the other southern pines begin height growth immediately after germination, the longleaf pine remains for an indeterminate period of years in the stage in which it is scarcely distinguishable from surrounding grass. It develops so-called "primary" leaves just before the cotyledons fall off; that is, from one to two months after germination. At the end of the first year the first foliage leaves have appeared. Height growth of the stem may begin as early as when the tree is only 3 years old; on the other hand, cases have been observed in which the beginning of height growth was delayed until the age of 15 years. (The maximum duration of the delay is not known.) Observations and experimental results thus far fail to indicate what causes height growth to begin. The determining factor most certainly is not age, for seedlings of the same age on the same site have been known to vary in height from the "grass stage" to 8 feet or more. Factors that may work together in delaying the beginning of height growth are soil characteristics, the brownspot needle disease, competition for soil moisture, and fire.

Until recently in estimating the age of longleaf pines foresters in the South have followed the very inaccurate practice of assuming that the seedling requires seven years to grow so tall that a diameter measurement can be made at breast height (4½ feet).

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[2] Wholesale Prices, 1930 (Bulletin 543); and Wholesale Prices of Commodities, December and Year 1931.

cent anatomical studies have shown that the age of
gleaf pine can not be determined with any degree
accuracy through ring counts. Irrespective of age,
ile the seedling is in the grass stage no marked
tinction exists between the wood formed in the
ing and that formed in the summer; although the
m may grow thicker from year to year, the tissue
med in a given season or year is indistinguishable
m that previously formed. Rings in the stem or
the root of longleaf pine, therefore, indicate only
number of years that have elapsed since height
wth began.

he fact that growth rings are not formed by long-
f pine in the grass stage may be due to the non-
stence of definite growing and dormant seasons
seedlings in that stage. It seems that such seed-
s send out leaves whenever weather conditions are
orable, regardless of the season. Longleaf pine
dlings of different ages in the grass stage have been
erved to send out needles at various times within
winter months. Seedlings that have begun height
wth have definite active and dormant seasons,
wing rapidly in the early spring, slowing down
siderably toward the end of summer, and remaining
ctive during the winter. The result is a distinct
erentiation of woody tissue into spring and summer
od.

An 8-Year Campaign Against the Mountain Pine Beetle

By F. P. **Keen**, United States Bureau of Entomology

A fight of eight years against the mountain pine
tle in Crater Lake National Park seems at last to
e been won by the National Park Service with the
peration of the Bureau of Entomology and the
rest Service. In 1925 a tremendous mountain pine
tle epidemic swept down from the north, killing the
gepole and western white pines as it went and threat-
ng total destruction to stands of these species in
ater Lake National Park. These epidemics often
eep over large tracts of timberland, killing thousands
trees as they go. In advance of the main swarm of
ects, new centers spring up and grow in size until
arrival of the main body, when they give impetus to
forward surge. To destroy the beetles in the main
a of the infestation was financially out of the ques-
n, but these isolated attack centers could be cleaned
in the hope that the main invasion would not cross
tain natural barriers. This control strategy was
pted by the Park Service with the help of the
reau of Entomology, and the lodgepole pine stands
the Sand Creek and Anna Creek drainages were freed
m local centers of infestation. The effort was
cessful in stopping any increase from these points,
the next year a vast swarm of beetles migrated
from the main centers to the north into one of the recently cleaned units. The newcomers were also destroyed and the area cleaned up anew, but each year beetle invasion had to be repelled, while the main epidemic continued in the stands north of the lake, killing more and more of the trees.

By 1929 the main body of the epidemic had swung around the lake both to the east and the west. The menace to the southern stands was greater than ever. That year marked the crisis in the control battle, with 26,660 infested trees burned and $21,073.84 spent in control work. By 1930 the main infestation to the north, west, and east had practically burned itself out, leaving a forest of snags. The influx of beetles into the southern stands lessened and each unit covered by control work in 1930 and 1931 showed a consistent 75 per cent reduction in infestation, with little or no reinfestation through migration.

The campaign in the spring of 1932 marked the final step in the war against the beetles. The work was spread over 30,000 acres and 20,311 trees treated. Old epidemic centers were entered and the beetle broods struggling for existence in surviving trees were destroyed. Nothing was overlooked in the final clean-up of the southern half of the park and immediately adjacent national forest lands. The only survivors swept on past the park to a stand of lodgepole pine to the southeast. These are not expected to return.

Many trees were killed by the beetles and by control burning, but enough were saved to make the battle well worth while. As a result of the campaign the following facts have been established: Epidemics of the beetle in isolated centers can be readily controlled, but reinfestation of cleaned areas will continue as long as there are infested areas close by; the amount of reinfestation will be determined by the magnitude of the main infestation, its proximity, and the direction of its spread.

* * *

In a note recently appearing in Ecology, I. T. Haig, of the Northern Rocky Mountain Forest Experiment Station, reports on a series of tests made by the station on the germination of seed stored in the duff. Results of these experiments show that about one-third of the viable seed germinate in the second year of duff storage, but because of unfavorable light and moisture conditions in a dense stand the resulting seedlings die almost immediately. Seed germinating in this manner before the area is cut or burned over are, of course, wasted so far as future regeneration of the stand is concerned. It is evident, says Mr. Haig, that this premature germination is one of the factors which determine how many of the seed of any one crop of cones will remain dormant in the duff until the removal of the overwood stand and hence be available in regenerating the area.

Fire Losses in Ponderosa Pine Prove Value of Protection

By I. V. ANDERSON, United States Forest Service

Ponderosa pine is no doubt the most important commercial pine west of the Great Plains. Its geographic range extends over a tremendous area. It is the principal timber tree of the Black Hills region of South Dakota, the lumbering centers of western Montana, south central British Columbia, Oregon and Washington east of the Cascade Mountains, California, Arizona, and New Mexico. The total volume of ponderosa pine contained within its commercial range is estimated at 251 billion board feet, a tremendous volume of timber compared with that of its only two western competitors in pine lumber markets, California sugar pine and Idaho white pine.

When the 19 billion board feet of virgin Idaho white pine and the 36 billion board feet of virgin California sugar pine are gone, there will still be an enormous supply of ponderosa pine. Just how long this supply will last is difficult to predict because of the various factors affecting the rate of cutting, which constitutes the greatest drain. During the past 10 years the annual cut of ponderosa pine has averaged 2,655,441,000 board feet. This, of course, includes only that volume being manufactured into lumber.

Insects, disease, and the elements are also important agencies that must not be overlooked in the annual drain on the supply of ponderosa pine timber. But when compared to those from fire, the normal losses from these agencies are relatively unimportant. Fire has in a sense been chiefly instrumental in the development of the composition and character of our virgin ponderosa pine stands as we find them to-day. Throughout the past two or three centuries fires have constantly occurred in stands ranging from seedlings to 600-year-old veterans. At regular intervals they have destroyed and damaged the young growth, leaving as survivors only the hardiest trees, many of which carry the scars of their struggle for existence throughout their lifetime.

At first thought the loss to the lumberman from fire may seem negligible. Usually not more than 5 per cent of the merchantable ponderosa pine trees are killed outright by a single fire, and rarely as many as 15 per cent, depending upon the severity of the fire season and the amount of underbrush, advance growth, and associate species present in the stand. These losses have sometimes appeared so trifling that the desirability of fire protection has been questioned. If the actual number of merchantable trees killed outright by the fire were a true measure of the damage, fire protection might be considered unprofitable on a strictly economic basis. But that is not the whole story. Quality depreciation in the wood of fire-scarred trees constitutes an additional and more serious loss in values.

In a study recently made in the ponderosa pi stands of western Montana, 6 treees out of 26 per a showed visible signs of fire damage, principally in t form of fire scar. As would be expected, loss in val from fire for trees of different sizes increased with i crease in size. Based on lumber prices prevailing 1928, these six trees each suffered an average loss $1.81 in lumber selling value. The average sellin value loss per acre would then be six times $1.81, $10.86. This is not a theoretical loss but a measurab loss caused by recurring fires during the past centu or so. Its importance and seriousness can best illustrated by computing the loss sustained by a give logging unit.

The Camas logging unit on the Flathead Indi Reservation in western Montana contains approx mately 120 million board feet of ponderosa pine about 12,000 acres. This is a typical pine stand f the region, so it is assumed that depreciation from fir during the past century or so has been identical wit the average. If this is true, the total fire depreciatio of this logging chance during the past century or has been $10.86 per acre, or $130,320 for the enti stand of timber.

Studies of rate of growth of ponderosa pine, after th virgin stand has been properly cut over leaving th young thrifty trees for a future crop, indicate tha with adequate fire protection, it will take 120 years t produce a second crop equal in volume to the origin stand. According to Forest Service and timber pr tective association figures, 5 cents per acre over a lon period will be ample for the best type of fire protectio or $600 per year for this area. If adequate fire pr tection had been given this stand during the past 12 years, the total bill would be $72,000. It is an estab lished fact that the best type of fire protection wi eliminate practically all fire depreciation in ponderos pine stands. The protection expenditure of $72,00 during the past 120 years would have saved value amounting to $130,320. Thus the net return from fir protection during the 120-year period could be com puted as $58,320 in this logging chance.

These facts indicate that organized fire protectio yields big dividends, even when considered only fro the standpoint of depreciation in lumber values cause by fire scar in a certain proportion of the merchantabl trees of the stand—a consideration that entirely over looks damage to the future stand through death o young growth, loss in watershed protection values, an depletion of soil fertility. The foregoing example o loss from fire represents only a small area. The entir commercial range of ponderosa pine covers approximately 40 million acres scattered from British Columbi to the Rio Grande. Assuming that this vast area o timberland has suffered fire losses during the past tw centuries in the same ratio as in the example cited, th total net loss chargeable to fire is $434,400,000.

Fire protection in ponderosa pine pays.

merican Society of Arborists Organized

A new society "for the protection of tree life and the provement of arboriculture" was organized during e 1932 meeting of the National Shade Tree Confer- ce in Rochester, N. Y., in August. To be known as e American Society of Arborists, the new organization ll be composed of regular members who have been gaged professionally in the care and protection of ade and ornamental trees for at least 10 years, norary members, and junior members. The society ns to promote effective means for the protection of e life, to disseminate information on trees, and to ucate the public in matters of tree care.

Officers elected at the first meeting were Charles F. sh, Cleveland, Ohio, president; O. W. Spicer, Stam- d, Conn., vice president; Norman Armstrong, White ains, N. Y., secretary-treasurer; and R. M. Weakley, arren, Pa., and Vance I. Shield, St. Louis, Mo., mbers of the executive committee.

ssil Pollen in Peat Deposits Reveals Forest Succession

Evidence that a coniferous forest once flourished in e region now occupied by Bryant's Bog, Cheboygan unty, Mich., and was displaced by a deciduous forest s been revealed through a study of fossil pollen in the t deposits of the bog made by J. E. Potzger, who rried on this work in 1931 at the Biological Station the University of Michigan under the direction of C. Gates.

Bryant's Bog, near Douglas Lake, Mich., is evidently old glacial kettle lake, approximately 65 feet deep. ough the pine type predominates over most of this ion, the principal cover of the plain and upland adja- t to the bog was a virgin deciduous forest up to a years ago, when the timber was cut. Peat from e bog was collected at 1-foot intervals to a depth of feet, and specimens of the fossil pollen found in each er were examined. Pollen of conifers was very rce in the upper layers of the peat, deciduous pollen edominating to a depth of 8 or 9 feet. Assuming ap- oximately 100 years for deposition of 2 feet of peat, e pollen record correlates with a ring count of the rdwoods of the region, made by Professor Gates en the trees were cut, which showed an age of about years for the oldest trees. Below the 9-foot level niferous pollen suddenly became dominant, indicat- ; the possibility that a destructive factor aided in e displacement of the conifers.

Similar studies of pollen deposits in peaty bogs have en made in Ohio and Iowa by Paul B. Sears, of the iversity of Oklahoma, and George H. Lane, respec- ely. The combined results of their investigations eal a succession backward from recent times with kory predominating, through beech and other hardwoods, to pine, and finally to the first forest after the Ice Age, which was of spruce and fir.

Postglacial vegetation of northern Italy has been investigated by Paul Keller through similar pollen analyses. Present-day forests there were preceded by chestnut; beech, oak, linden, and elm in mixture; and pine, with which appeared some spruce and fir; to the earliest forest after the retreat of the ice sheet, which was composed of birch with some willow and pine. These findings tally with those in northern Europe except that the pine period there was followed by a Corylus period. Corylus in northern Italy reached a maximum of only 37 per cent.

A history of the climate of a region may be reconstructed through establishment of the predominating vegetative type for each period.

Naval-Stores Station Opened in Florida

Formal opening and dedication of the new naval-stores experiment station to be conducted by the Bureau of Chemistry and Soils of the United States Department of Agriculture took place November 18, 1932. The station is located at Olustee, Fla., 12 miles east of Lake City. In cooperation with the Florida Forest Service and the Southern Forest Experiment Station of the United States Forest Service, aid will be offered the naval-stores operators of the South in developing improved practices in accordance with the findings of the scientists at the new station.

Nearly 500 people attended the opening exercises, including representatives of southern forestry and naval-stores associations, the Florida Board of Forestry, the Bureau of Chemistry and Soils, the United States Forest Service, and the naval-stores industry.

◆

The number of hunting licenses issued in the United States, including Alaska, dropped off in 1931, 561,308 fewer licenses being issued in that year than in 1930. The total number issued in 1931 was 6,342,626, against 6,903,934 in 1930. For 23 States the reports include combined hunting and fishing permits, but separately issued fishing licenses are not included. Revenues received by the States through the issuance of hunting licenses also declined, from $10,017,564 in 1930 to $9,867,352 in 1931. Owing to increases in the fees in some States, however, the total revenue was nearly $500,000 greater than that of $9,391,412 in 1929.

◆

Continuation of the work of the West Coast Lumbermen's Association has been assured by the accession of 88 new mills to membership since May 31, 1932. The total membership now represents 84½ per cent of the productive capacity of the lumber industry in the Douglas-fir region.

Newsprint Less than Three Days from Standing Trees

"This paper made from pines standing in Richmond County three days ago!"

This statement appeared on the programs of a joint meeting of the civic clubs of Augusta, Ga., at which Charles H. Herty spoke on his success in making newsprint from the southern pines. A picture of the trees growing in the woods and one of the pulpwood piled up after being cut appeared on the program with the explanation that the views were taken only three days before and that the trees pictured had been converted into the paper on which the programs were printed.

It was actually only 48 hours from the time the pines were cut, under the direction of C. N. Elliott, district forester of the Georgia forestry department, until they had been made into white paper at the research pulp and paper plant at Savannah. In 60 hours the programs had been printed and distributed.

❦

A forest of 324 acres, planted by the H. C. Frick Coke Co. of Scottdale, Westmoreland County, Pa., from 1906 to 1912, now contains many trees ready for cutting for mine props and lagging. The plantings were made under plans furnished by the United States Forest Service. Best growth was made by red oak and silver maple. Some of the 25-year-old stands of oak and maple recently examined were found to contain trees 50 feet high and 10 inches in diameter; most of the stands were 30 to 40 feet in height. Except wher forest fires have invaded portions of the area, the plantings have proved commercially profitable.

❦

Alarmed by the threat to the Philippine lumber industry involved in offers of Soviet Russian representatives to sell Russian or Siberian fir in Manila at about half the price of the lowest grade of native lumber the Philippine Bureau of Forestry has created a committee to study the problem. The Philippine Legislature also is considering the best steps to take to protect the lumbermen from this competition.

❦

Parks of Washington, D. C., contain 200 species of trees, according to the Office of Public Buildings and Parks of the National Capital. Trees of Europe, Asia Africa, and South America are represented, but the predominating species is American elm.

❦

A 55-year-old stand of loblolly pines that is probably the oldest plantation of the species in America is located at Jesterville, Wicomico County, Md. Planted with wild stock at 8-foot intervals by John F. Jester in 1877 the trees average 90 feet in height and 14 inches in diameter, and the stand shows a yield of 35,320 board feet per acre.

Foreign Notes

The Teak Forests of Java

A highly specialized form of tropical forestry is practiced in the extensive teak forests of Java, which cover about 700,000 hectares (1,730,000 acres) of the island. The teak-timber trade is an important revenue-making activity of the Dutch Government of Java, the surplus of revenue over expenditure averaging £500,000 per year from 1925 to 1929.

E. J. Strugnell, assistant conservator of forests of the British Malayan Forest Service, describes the Javanese teak forests and their management in the Empire Forestry Journal for July, 1932. In Java, says Mr. Strugnell, teak is found from sea level to an altitude of about 2,000 feet, the upper limit varying considerably in different places. It is found growing naturally only in localities with a marked dry season. He continues:

> At low altitudes in Java teak is a gregarious tree, a characteristic which adds considerably to its value, owing to the resulting ease of working. In closed stands it grows to an average height of 120 feet with a straight unbranched stem. Under the most favourable circumstances it grows to a height of 150 feet, but on poor soil the average height is in the neighbourhood of 60 feet and the bole is crooked and branchy.
>
> In comparison with the long branchless boles which are frequently met with in the case of species of Shorea and Dipterocarpus in virgin rain forest, teak gives the impression of being a smaller and branchier tree.
>
> The timber is probably the most widely known in the world, and it is doubtful whether another exists with a better combination of good qualities. Its durability is excellent; it is easy to work and does not suffer from splitting, warping, or shrinking if properly seasoned, while it is strong enough for all ordinary purposes. It is somewhat brittle, and cost also limits its use.

Some of the best teak stands are in East Java near Tjepoe, where 33,000 hectares of teak forests are administered by the Dutch Forest Service.

> In Tjepoe, teak is growing under favourable circumstances and reaches a large size. Clear felling with artificial regeneration is practised exclusively. The clear-felled area is given out to Javanese contractors

mediately on the close of the rainy season in April d May. The felling slash and other litter is piled on e stumps and burnt. Amongst other advantages this events the stumps from coppicing. In contrast to actice in British India, the burning is limited in ent as much as possible.

After burning the ground is worked over by changkol large hoe) to a depth of about 15 cm. Hoeing is eferred to ploughing, as the latter is said to disturb e relative position of the soil layers by burying the per layers. Too-deep working is considered to be rmful, as, of course, is too-shallow working. The tivation of the soil is done in the dry weather, June September. Although the ground is hard at this ne, the disadvantage is outweighed by the absence erosion and consolidation of the soil by heavy rains.

The teak seeds are sown at the beginning of the wet onsoon in October. Germination begins in 12 to 15 ys and continues until the fortieth day, when it falls until about the ninetieth day. The teak seeds are vn in rows 2 metres apart in lots of four to five 1 ter apart in the rows. As the germination percent- e of teak is in the neighbourhood of 40, it will be en that this is necessary. The distance between the vs may be increased to 3 metres on the best quality ls, but wider spacing than this leads to the produc- n of misshaped and branchy trees. Blanks are beaten from more successful clumps of seedlings with plants th not more than four leaves, and weeding of harm- species such as alang-alang (*Imperata* spp.) is car- d out.

Between the rows of teak a row of kemlandingan *eucaena glauca*) is sown. This has proved its worth many ways: It improves the quality of the soil by eans of the nitrogen-fixing nodules on its roots and its heavy fall of leaf material; it serves as a cover op protecting the newly disturbed soil from wash and rdening in the sun; it prevents the growth of the eaded alang-alang. Many other species have been ed for this purpose, such as walikoekoen (*Schoutenia ata* Korth.), but none have given such good results. ie difference in the growth of teak growing with and thout *Leucaena glauca* is marked.

The *Leucaena glauca* must be cut over at the end of e first season, otherwise it is liable to suppress the ung teak, and there is also danger of fire. The cut aterial soon rots and the danger of a fierce fire kill- g the teak is much diminished.

Between the teak and the cover crop the contractors ant their crops, the most favoured of which is maize, ich has given very good results. When the plants ve grown well, there is some danger of the crop over- adowing the teak. After harvesting, the haulms are t and arranged along the teak rows as manure. Care s to be taken that they are not left to interfere with ak or cover crop. * * *

The young teak grows very fast, a height of 2 metres ing reached in the first year and 7 in the second, the ant up to this stage consisting of a long unbranched em.

Thinning is scheduled to take place in the second to th years according to the rate of growth. This initial eration, which brings in no revenue, was apparently hindhand in the Tjepoe area (July, 1930). Thin- ngs are made at intervals during the rotation and a nsiderable revenue is derived therefrom.

The rotation is fixed provisionally for the majority stands at 80 years. At present the exploitation is nfined, except for a very few planted areas, to old ands up to 350 years old.

It will be realised that, especially where there is suffi- ent land available for cultivation without entering the rests, it is not always easy to obtain sufficient contractors to deal with the annual felling area. At one time it was endeavoured to attract men by giving rice in part payment, the rice presumably being used until the crop was ready. A system which is now being used is to give the man cattle as repayment for his work, the debt being cleared off when the contract is finished. As the owner can find work for his cattle by extracting timber, the system has advantages for the forest department. Money payments are also largely used.

The contract expires at the end of the second growing season, so that the *Leucaena glauca* can be cut over at the end of the season, the last work expected of the contractor, as the teak can then look after itself. The next areas are given out in the April of the second year to encourage the contractor, while he does the second cutting of the cover crop referred to above, not to cultivate the land for the second season. This second cultivation is often harmful, as the contractor is apt to endeavour to give his crop sufficient light by removing the large leaves of the young teak. The method also has the advantage that fewer contractors are necessary.

The working described above holds for the better quality soils. * * *

When an area comes up for exploitation, the whole of the trees on the area, all teak, are girdled two years before felling. The reason for this girdling is commonly accepted by members of the forest service to be that the timber splits badly if felled green, together with the subsidiary advantages that it is easier to extract, owing to its lighter weight, and that it is partially seasoned. The practice was apparently imported from British India by Hindus accustomed to this method of killing trees on land wanted for cultivation, or from Burma or Siam, where it is practised in order to make the timber light enough for floating, but in none of these countries is teak ringed for the reasons stated by the Dutch, who do no floating. The growing conviction amongst Dutch forest officers that ringing is a useless custom has been considerably strengthened by a recent publication by Dr. Charles Coster, in which he proves conclusively that the girdling of teak two to three years before felling has no influence on the splitting of the timber, or on its physical qualities, and that it is of no use as a method of seasoning. The tree loses 30 per cent of its wet weight during the two years after girdling. It is doubtful whether this decrease in weight results in a similar reduction of transport costs in a method of extraction which does not include floating, while, on the other hand, the increased danger of heartshake and breakage in felling necessitates an expensive method of felling. The rotation is lengthened by two years and the ground becomes covered by secondary growth, owing to the penetration of light to the ground, which adds to the cost of cultivation for the subsequent planting.

Owing to the brittleness of the wood it is often not felled by axe or saw, but is pulled over by a system of cables and pulleys worked by two winches which are operated by five coolies. The tree to be felled is often linked up with another tree by a cable with a certain amount of slack, so that the first tree, as it gathers momentum in falling, pulls the other over with it. Besides the advantage of felling two trees at a time, the fall of both trees is softened. This system of felling has the advantage that the tree can be placed wherever it is wanted by native fellers, which is by no means always the case with axe or saw; even leaning trees can be pulled over through the vertical. As the butt is sawn off while the tree is lying on the ground, there is very much less wastage of timber than with felling with the axe. On the other hand the method is slow and expensive, although, owing to the low wages ruling in Java (30 to 35 Dutch cents or 7d. per day), the expense is not so great as might be thought, working out at approximately 35 cents (7d.) a tree. After felling, the tree is examined on the ground and instructions given as to the lengths into which it is to be cut up. These are booked. The tree is then cut up and dragged by teams of oxen to the stacking place on a branch of the logging railway, where the booking is checked. The stump is not used and is allowed to fall back, but the amount lost in this way is negligible, as there is no difficulty in cutting the last log off flush with the roots.

High lead logging has been tried in these forests, but can not compete with the primitive team of oxen.

At the stacking place the logs are cut up further if necessary and trimmed. The trimming removes the sapwood all around the log, which after the operation is as near a perfect cylinder as is compatible with the crookedness or otherwise of the log. * * *

With so pronounced a dry season as obtains in the teak areas, the danger of fire is naturally present, and fire towers are erected in commanding places to assist in the control of fires. Formerly large areas were burnt over by leaf fires in the dry season every year, without damaging the teak itself, though the loss of humus is considerable. Fire-control measures have now reduced the area burnt annually very considerably.

* * *

Experiments having demonstrated that the Scottish strain of *Pinus sylvestris* is best suited to Danish forest conditions, Denmark is now importing her seed requirements of this species from Scotland instead of from Germany and the Baltic countries, as was formerly the custom. The director of the Danish forestry department personally visited Scotland and selected the areas of Scotch pine from which the seed is to be obtained.

* * *

A Rumanian law of 1930 created a special division of the forest department to undertake the restoration of more than 1,000,000 hectares of land in Rumania rendered unproductive by overgrazing, deforestation, and erosion. Owners may be indemnified for loss o income, and the lands are exempted from taxatio while restoration work is in progress. If necessary th land may be expropriated. Cost of the work is share by the State and the local governments.

History of French River Exemplific Influence of Forests on Streams

A study of the history of the River Ire,[3] in the Department of Savoy, France, reveals the coincidence o periods of exploitation of the forests bordering the rive and torrential flooding of the stream. In correlatin the known facts about the forest with those concernin the river the effects of deforestation on stream flow ar clearly evident.

Until the 18th century there appears to be no recor of the river; if peaceful peoples have no history, it ca be assumed that it is the same with rivers. But sinc 1720 frequent floods have been recorded. It was a this same date that the iron industry was developed i Savoy and the forests of the Ire Valley were called upo to supply fuel for the furnaces. For two centuries th deforestation and the floods continued. Particularl disastrous floods occurred in the periods 1858–187 and 1895–1899, during each of which exploitation o remaining virgin stands left completely denuded area in the river basin. From the end of the 19th centur to the present the forests have been allowed to gro unmolested. They are now in excellent condition while the river has apparently lost its torrential character, the last flood having occurred in 1914.

* * *

Forests in Canada cover 1,151,454 square mile Some of this land, if cleared, would be suitable fo agriculture, but it is estimated that about 1,100,00 square miles can be permanently utilized to the bes advantage under forest.

Personals

Samuel N. Spring has been appointed to succeed Hugh P. Baker as dean of the New York State College of Forestry at Syracuse University. Doctor Baker will assume the presidency of Massachusetts State College at Amherst, Mass., on February 1, 1933. Professor Spring has been assistant dean of the New York State College of Forestry since February, 1932. As chairman of a committee which recently reorganized the forestry courses he has made an exhaustive study of the curriculum looking toward better coordination and effectiveness of the training offered by the college. Clyde Leavitt, who in September, 1932, became acting director of forest research of the college of forestry, wi succeed Professor Spring with the title acting assistan dean.

James O. Hazard, State forester of Tennessee, ha been appointed forestry member of the 1932–33 consulting staff of the Reelfoot Lake Biological Statio Tenn., which is under the management and control o the Tennessee Academy of Science.

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[3] E. Graber: L'Ire et Son Bassin. Revue des Eaux et Forêts, March 1932, pp. 203-209. English translation in the Indian Forester, September, 1932, pp. 502-506.

Helen E. Stockbridge, librarian of the United States orest Service, died December 20 following an operation. iss Stockbridge entered the Forest Service in 1901. nce 1904 she had been in charge of the library, which s increased from a very small nucleus to a complete llection of more than 27,000 books and pamphlets on restry to which current publications are constantly ing added. Miss Stockbridge was an authority on restry literature, and prepared bibliographies on many fferent phases of the subject.

Officers elected at the recent annual meeting of the hio Valley Section of the Society of American Forest-s are Shirley W. Allen, professor of forestry at the hool of Forestry and Conservation of the University Michigan, chairman; T. E. Shaw, extension forester Indiana, secretary-treasurer; and R. B. Miller, ief forester of Illinois, in charge of new memberships.

George W. Peavy, dean of the school of forestry of regon State College, as ranking dean of the college s been made permanent chairman of its administra-ve council.

E. G. Mason, assistant professor of forestry of the regon State College, is at Yale University this year orking for the doctor's degree. Richard Kearns is bstituting for him at Corvallis.

Harry Smith, a graduate of the Pennsylvania State orest School, 1925, who has been with the Alabama epartment of Forestry for the past six years, is doing aduate work at Yale University.

George M. Jemison, of the Northern Rocky Mountain Forest Experiment Station, Charles A. Connaughton, of the Intermountain Forest Experiment Station, and E. M. Hornibrook, of the Southwestern Forest Experiment Station, junior foresters, are detailed for several months to the Washington (D. C.) office of the Forest Service on projects of their stations. Mr. Jemison is making a study of the relation of duff moisture to weather. Mr. Connaughton's projects are analysis of the rate of melting of snow in open and timbered country as affected by temperature and wind, and determination of rates of growth in the ponderosa-pine type in Idaho from permanent sample plot data. Volume difference between jack and ponderosa pine trees of the same sizes is being studied by Mr. Hornibrook.

Arthur C. Ringland, formerly European forestry representative of the Departments of Agriculture, Commerce, and State, after spending several months in the Washington (D. C.) office of the United States Forest Service, sailed again for Europe in October, 1932, as European forestry specialist of the Forest Service.

Charles H. Schaeffer, for several years associated with the Alabama State Commission of Forestry as forest inspector, as chief of the bureau of silviculture and lands, and as division forester, has accepted a position as district forester with the Florida State Forest Service.

Chapin Jones, State forester of Virginia for 18 years, has been appointed director of education and research of the Virginia division of forestry. F. C. Pederson, assistant State forester under Mr. Jones, has been named acting State forester.

Bibliography

orest Fire Hazard and Special Fire-Weather Forecasts

By T. E. Reed, United States Weather Bureau

In a recent bulletin published by the Massachusetts orestry Association,[4] Paul W. Stickel, associate silvi-lturist at the Northeastern Forest Experiment Sta-on, presents an admirable summary of a study of eather and forest fire hazard in the white pine region of central New England. The report is based on investigations at Petersham, Mass., conducted by the Harvard Forest and the experiment station during the years 1926–1930, inclusive. This study reveals that in the spring months (March, April, and May) 81 per cent of the annual number of fires occur on 93 per cent of the total area burned, accounting for 95 per cent of the damages and 91 per cent of the suppression costs. Only about 3 per cent of the annual fires, area burned, damages, and suppression costs are charged to the fall fire season (October and November).

A concise and interesting relationship is shown between relative humidity and duff-moisture measure-

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Stickel, Paul W.: Weather and Forest Fire Hazard with Special eference to the White Pine Region of Central New England. Massa-usetts Forestry Association Bulletin 153. 1932.

ments made in the open at 2 p. m. and forest fires and area burned. Stickel rates as days with a high degree of hazard those on which the relative humidity ranges from 11 to 40 per cent and surface duff moisture content is 7 per cent or less. Such days accounted for 75.6 per cent of the annual fires and 91.3 per cent of the area burned. Days of moderate hazard are those on which the relative humidity ranges from 41 to 50 per cent and surface duff moisture from 8 to 11 per cent. Such days accounted for 13.7 per cent of the fires and 5.9 per cent of the area burned. Days with a relatively low degree of hazard are those on which the relative humidity ranges from 51 to 70 per cent and surface duff moisture from 12 to 22 per cent. Such days accounted for but 7.4 per cent of the fires and 2.1 per cent of the acreage burned. Days with very little or no hazard are those on which the relative humidity ranges from 71 per cent to 100 per cent and surface duff moisture is 23 per cent and higher. Such days accounted for only 3.3 per cent of the fires and 0.7 per cent of the area burned.

In New England more than 99 per cent of the fires are man-caused—mostly by carelessness. Thus it is evident that prevention must be the method of attack to effect control of the problem. The foregoing figures on relative humidity and fire data show that a mid-afternoon reading of relative humidity of 50 per cent or less is indicative of fire danger. Stickel points out that by the use of this information the fire warden, by the cancellation of burning permits, the use of additional patrols in dangerous areas, the temporary enlargement of fire-fighting crews, and other preventive measures, may be able to eliminate fires on such days. This accomplished, the number of fires would be cut down by almost 90 per cent with a resulting reduction in area burned of about 98 per cent.

The amount of moisture in the duff determines the character and severity of forest fires. An interesting graphic presentation of the intake and outgo of duff moisture and the weather factors which influence the precipitation-evaporation cycle is shown in the bulletin. Weather factors directly affecting the degree of hazard—precipitation, heat, atmospheric-moisture deficit, and wind—are discussed.

A rating scale of hazard is presented, based on results of about 600 inflammability tests made with five common firebrands—matches, pipe heels, cigarette butts, small coal sparks such as are thrown off by steam locomotives, and small camp fires. Varying degrees of hazard or zones of inflammability in relation to duff moisture content and these common causes of forest fires are shown.

Observations made in the open and in a mature stand of white pine and hemlock clearly reveal the importance of forest cover in reducing fire danger and confirm the belief that trees themselves are one of the best means of "fireproofing" forest land.

Stickel combines the factors of relative humidit air temperature, and number of hours since the la measurable amount of precipitation in alineme charts by means of which the fire warden or other fore fire protection official may estimate the moistu content of the duff and predict both the present an future degrees of hazard. Two charts illustra weather observations made in the open at 11 a. m and 5 p. m.

Stickel presents clearly the valuable application to a phases of fire control of the information contained i this manual when used in conjunction with the regul and special fire-weather forecasts issued daily by th district fire-weather forecast center of the Unite States Weather Bureau.

Growth and Yield of the Western Whit Pine Type

By F. X. Schumacher, United States Forest Service

The results of a thorough study of the growth o even-aged stands of the western white pine type ha recently been published by the Department of Agr culture as a technical bulletin.[5] I. T. Haig, of th Northern Rocky Mountain Forest Experiment Statio of the Forest Service, conducted the work. His bas data were taken from 306 sample plots of western whi pine stands between the ages of 20 and 160 years, eac plot having been located in essentially even-aged norm stands judged to be producing maximum volume fo their site-age condition. The data from 35 plots we rejected because statistical analysis did not corrobora the judgment of the field men as to their normality.

The bulletin is replete with tables of volume fo individual trees of the important timber species en countered, of yields of even-aged stands by 10-yea age classes, and of stem distribution by diameter class within the stands.

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A report dealing with all phases of the chemic utilization of wood and embodying the latest develop ments in this field both in this country and abroad, b H. K. Benson, chairman of the division of chemistr and chemical technology of the National Researc Council, has been published by the National Committe on Wood Utilization of the United States Departme of Commerce under the title, "Chemical Utilization o Wood." The bulletin has 151 pages and 25 illustra tions. It may be obtained from the Superintendent o Documents, Washington, D. C., for 15 cents a copy.

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[5] Haig, I. T.: Second-Growth Yield, Stand, and Volume Tables fo the Western White Pine Type. U. S. Department of Agricultural Tec nical Bulletin 323. 1932.

A Technical Study of Redwood

By Selwyn J. Sharp, California Redwood Association

Technical Bulletin 305, "The Strength and Related operties of Redwood," by R. F. Luxford and L. J. arkwardt, published by the United States Depart- ent of Agriculture, reports the results of field work in e redwood region of California and subsequent tests ade at the Forest Products Laboratory at Madison, is. The field work included a comprehensive density udy, covering both virgin and second-growth timber the important producing regions of Humboldt and endocino Counties. The density of trees from rious site classes and of wood from various portions each tree was analyzed.

The strength tests were made from logs of selected es shipped to the Forest Products Laboratory. rinkage determinations were made both in the field d at the laboratory. The trees for the laboratory sts were chosen on a basis of the findings of the density udy as representative of the range and the average. e bulletin ably presents the findings of these tests th a comprehensive series of tables and plates and a ief descriptive text. In addition to the tables owing general average figures the appendix includes merous tables indicating variations which may be ributed to the various factors encountered. Virgin ber receives major treatment in the report.

Intelligent manufacture, grading, and marketing, to e full advantage of natural properties, are essential the best utilization of any kind of lumber. The uired information has come, to a large degree, from e general knowledge of the species gained from perience. The judgment of the men in the mills oduces surprisingly good practical results without a ckground of definite facts. But the broad general owledge and the opinions of the "old timers" are en less effective in convincing a stranger that he ould utilize a certain species. The more specialized e use the more specific must be the data to convince e prospective user that the species is suitable. Such ta, as applied to certain of the important properties redwood, are adequately furnished in this bulletin. ring recent years, the use of redwood for purposes in ich it is desired to take advantage of its natural rability and in which strength is an important factor s been actively promoted. The facts given in the lletin are particularly timely, and the values shown redwood by these tests will, on the whole, assist in s promotion of redwood lumber.

The tests as reported were ably planned and executed give the desired information. There is usually a ling in connection with the results of any such series tests that far different data might have resulted from more extensive examination. The description of the thod used in this particular work gives assurance that the range of conditions has been adequately covered and accurate species averages obtained.

Table 3, giving relative values for redwood as compared with other species, will probably prove of greatest usefulness in general promotional work. This direct comparison between species seems to be the most widely requested and the most effective class of information. Most buyers are intimately acquainted with some particular species, and a comparison with the well-known wood is in many cases all that is desired. Table 4, giving general averages for density, shrinkage, and strength, will likewise be extensively used for information in regard to the qualities of redwood.

For many important specialized uses, variations from the average are more important than the average. For this reason the more detailed tables given in the appendix, while they will not be used as extensively as the general averages, will prove of greater value in many instances. These tables do not, of course, cover all of the variable factors encountered, but the value of further segregation would probably not justify it. Three graphic plates showing values for individual tests are particularly interesting.

A considerable segregation of redwood into density classes is now made by manufacturers. For such uses as pattern lumber and the best grades of finish and siding, the lightweight stock is particularly valuable. Uniformity, appearance, light weight, and ease of working are more important considerations than strength for these purposes. Where strength is a major consideration, structural grades, selected from heavy stock, are usually specified. The selection of this stock must continue to be based upon the judgment of mill men and inspectors. The exact data given in this bulletin will confirm or disprove theories on which this judgment is based. The use of these facts should, therefore, improve the accuracy of the judgment and assist in better selection of material for specific uses.

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FOREST WORKER

March, 1933

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UNITED STATES DEPARTMENT OF AGRICULTURE

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Announcements

Fifth Pacific Science Congress

Resumption of plans for the Fifth Pacific Science Congress, postponed from 1932, has been announced by the National Research Council of Canada. The meeting will be held in Victoria and Vancouver, British Columbia, between June 1 and June 14, 1933. During the week following adjournment of the sessions of the congress, excursions will be arranged through the western part of Canada.

An invitation to participate in the congress has been extended by the Canadian Government through the National Research Council of the United States to the scientific societies and institutions of the United States.

* * *

The National Academy of Sciences will hold its annual meeting in Washington, D. C., April 24–26, 1933. The sessions will be held in the academy building, 2101 Constitution Avenue.

Western Forestry and Conservation Association Meeting

Lumbermen, foresters, and public land officials o the Western States and British Columbia have b invited to meet under the auspices of the Wes Forestry and Conservation Association in Sea Wash., March 22–24, 1933, to discuss problems forest land management in the West. The prog includes discussions of cooperative protection proble use of public unemployment relief funds, and readj ment of forest land ownership necessitated by the gr ing area of tax-delinquent land.

* * *

Two sections of the Society of American Forest the California and the North Pacific, are schedule meet with the Pacific Division of the American A ciation for the Advancement of Science at its sev teenth annual meeting, to be held June 12–15, 193 Salt Lake City, Utah.

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FOREST WORKER

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State Forestry

Organized Suppression Crews Prove Advantageous in Oregon

By E. H. MacDaniels, United States Forest Service

ncreased efficiency and reduced costs are two of the
antages gained through the use of the organized
suppression crews with which five county fire patrol
ociations in Oregon have replaced the old system of
ng fire fighters hit-or-miss in an emergency. Better
sonnel may be obtained when only able men of
wn responsibility need be hired. The motive for
ing fires to get work or for prolonging fires is elimi-
ed, and the number of incendiary fires is consequently
reased. Protection costs may be reduced by use of
crew on improvement work and reduction in the
nber of wardens.

he first of the private patrols in Oregon to use
anized fire suppression crews in addition to the
dens usually employed was the Klamath County Fire
rol Association. Following the practice of the Fed-
l Forest Service in its use of road and improvement
ws, a system of protection motor ways was laid out
l a crew of 8 to 12 men was employed and equipped
h a Cletrac, a V-drag, and a truck big enough to
ry both men and equipment. Improvement work
an at the opening of the active fire season, which in
math County is ordinarily early in July. The
ctor and drag were used in road construction; upon
ice of a fire about 10 minutes were required to load
m onto the truck and get started. The practice
taking the machinery to every fire was followed.
ns of more than 70 miles were occasionally made.
e effectiveness of this crew and its equipment is
imated to be equal to that of 50 to 100 men who
st be assembled and supplied with hand tools, camp
tfit, and the other necessities after the fire is reported.
th some modifications, this plan has been followed
ce 1927.

n 1928 or 1929, a similar plan was taken up in
ephine and Jackson Counties, which are State patrol
its, and in both of which incendiary fires are the
ef cause of trouble. Large areas of old burns,
ered with highly inflammable grass and brush,
ke up a good part of the lower foothill lands in these
o counties. Fires start easily, spread fast, and extra quick action is called for to keep them to small size. Less importance is attached to improvement work in these units. The hazard justifies keeping the crews at headquarters and ready to go during most of the season. A couple of light cars of the pick-up body type are used in each unit. Boxes filled with hand tools provide seats for four men. By the time the report of the fire is complete, the car is on the way, without too much attention to the speed laws.

In these two units many fires are believed to have been set and kept going in order to get work. Since the crews take care of all fires, this motive for setting new ones is removed, and no member of any permanent suppression crew has yet been suspected of throwing fire over the line in order to make the job last longer. There is every incentive to put it out quick and resume the pinochle game where the alarm interrupted it. No estimate can be made of the saving from removing a part of the motive for setting fires, but it must be substantial.

The Douglas County Patrol Association has nearly a million acres to protect. Much of it is grass and brush foothill land, similar to that farther south, in the above-mentioned units. Higher in the hills large areas of Douglas fir forest have been burned. In this type, values are high and suppression is expensive. Since about 1928, the association has employed a suppression crew of 8 to 20 men beginning early in August. In an ordinary season there are enough of what might be called routine fires to keep the crew busy all the time, and except on a few days during the height of the season they handle everything that comes up. Fire fighting, therefore, is mostly paid for by the month instead of by the hour, which is an additional item of saving. On foggy days and cool mornings the crew builds roads and trails on routes close to a telephone line, with a portable phone to keep them in close touch with headquarters.

In this unit, the plan of a central suppression crew started from the observation by the warden that three or four men hitting a fire together can usually get better results than one man who gets to it a little earlier, and the obvious fact that time and transportation are saved by starting the crew from one place instead of individual wardens coming from scattered stations. The only members of the Douglas

County crew not immediately available in one place are the lookouts, a few men who for convenience in issuing permits or for the effect on the residents are stationed in selected areas, and two men who are stationed at the entrance to an area where pack animals must be used. The old-time practice of stationing wardens all over the unit so that if a fire started in any district the local warden could put it out is definitely abandoned. The association would not consider going back to the old plan.

The Coos County Fire Patrol Association protects a little less than 1,000,000 acres. Extensive logged or burned areas, a population scattered through a large part of the timbered region, the conflicting uses of grazing and hunting, and much unemployment, made a burden that could be handled only with difficulty. During the 1932 season, beginning August 3, three suppression crews of 10 men each were employed at an average rate of $35 per month and board. From that time on they were engaged every day and most nights by the 250 fires, more or less, which occurred before the October rains.

Mississippi Relief Project Increases Protected Forest Area

By the use of relief funds to pay unemployed men to act as forest fire wardens, Mississippi has put into operation a plan which should greatly aid prevention and control of woods fires in the State. This work has been undertaken in eight counties—Attala, Benton, Choctaw, Clarke, Copiah, Holmes, Lauderdale, and Newton, mostly in central Mississippi. The State's protected area has been increased by 2,500,000 acres during the past few months, making a total area of 3,500,000 acres of potential forest land in Mississippi now protected from fire. Protection activities have heretofore been limited to the southern portion of the State.

The men are appointed at 5-mile intervals throughout a county, each one being responsible for the protection of about 10,000 acres of forest land. They are carefully selected by county supervisors and relief workers with the understanding that they may be replaced if found unsatisfactory by the State Forest Service, whose officers supervise the work. The duties of the new wardens are: To make contacts with the people in their districts with the object of obtaining the signature of every one to a volunteer forest protection agreement; to patrol the district; to fight fires; and to keep alive interest in protection. Each warden is paid for 8 to 12 days' work per month. Instructions and materials, including report blanks, are furnished by the State forest service. Work has been provided for about 300 men.

The wardens are meeting with success in obtaining signatures to the protection agreement, not more than 2 per cent of the people approached having refused to sign. Each person who subscribes to the agreer receives a card stating that he is a registered f protector in Mississippi for the year 1933. Practi all the residents, white and colored, of the cou participating in the project will have the need of with fire brought to their personal attention, and expected that as a result the fire records of t counties will be greatly improved this year.

Need of Forests Stressed at Land U Conference in New Jersey

That maintenance or restoration of forest cover is fundamental necessity in formulating a land-use gram was the outstanding conclusion of a confer held at Rutgers University, New Jersey, December 1932. This meeting was the first of a nation- series of land-use conferences to be held by the la grant colleges of the several States as recommende the Association of Land Grant Colleges in recogni of the vital need for a definite program of land throughout the United States.

More than 250 representatives of agriculture, estry, wild life, and civic and business interests me the conference and discussed such topics as farming forestry, water supply and wild life, soil erosion, re ation, tax delinquency, and financing. The func of forests in reclaiming idle land, balancing land protecting soil, wild life, and water, and solving problem of waste areas was stressed by all inter represented. It was agreed that the great area wild land, abandoned farms, and marginal or s marginal land should be taken over and administe by the public.

The program for the State of New Jersey, sponso by the New Jersey Department of Conservation Development, calls for the acquisition by the S for State forests of at least 200,000 acres of wild lan one-tenth of the total woodland area of the St Acquisition of this land is going forward as rapidl funds permit.

* * *

The total forest area burned in Alabama during 1 was 1,433,345 acres, or 6.4 per cent of the total 22,427,000 acres of forest land in the State. On 9,165,000 acres on which the State provided a tain degree of protection against fire the percent burned was only 2.75 per cent, while of the remain 13,262,000 acres, 8.9 per cent was burned, reports State forester.

* * *

At an average cost of $10.65 per acre, 1,036 acre the Pennsylvania State forests were planted w 1,308,275 trees in 1932. In addition, 1,600 pound seed and 844 bushels of walnuts and acorns were so in the four State forest nurseries.

Florida Trying Out New Protection System

variation of the usual patrol method of forest-fire trol, called the "retained warden bonus system," eing tried out this year by the Florida forest ice. The new system has been installed in two tective areas and is expected to aid in overcoming difficulties encountered in protecting forest land re the local inhabitants manifest little interest often outright antagonism toward any effort to trol fires.

he plan, which was originated by District Forester R. Whittington, of Panama City, Fla., provides for a tective area, in charge of a ranger, divided into den districts ranging in size from 200 to 2,000 s. The most desirable resident of each district is cted for appointment as retained warden for one r. His duties are to patrol his district, to prevent suppress fires, and to assist neighboring wardens ghting fires. Compensation is divided into monthly ments on the basis of one-half cent per acre per r for the land under his protection, as a retainer fee, h a bonus of one-half cent per acre additional for h month during which less than 3 per cent of his rict burns. If at the end of the year less than 3 per t of the district has been burned during the entire iod, another bonus of an additional one-half cent iven; and if no fires whatever have burned on his d during the year, he receives another one-half cent acre. The total compensation possible is, therefore, ents per acre for the year. Although for his year's k the warden may receive only $8 or $10, this sum ot insignificant when compared with the returns n a small field of cotton, corn, or tobacco.

nder this plan the ranger, who is equipped with a truck, assists the wardens in suppression work as ch as possible and encourages cooperation between m.

Sample Plots in Connecticut Contest

A contest which brought to light 10 interesting small est plots was held in Connecticut last fall. The plot cted as best by the judges—W. O. Filley, forester of Connecticut Agricultural Experiment Station; M. Ross, secretary of the Connecticut Forest and rk Association; and A. F. Hawes, State Forester—ongs to Charles Gold, who was awarded a prize $10. Arthur Brooks, patrolman, who reported the t, also received $10. The prizes were contributed by ividuals interested in forestry.

f the 10 sample plots examined, two were 1 acre h in size and the rest were one-half acre. The wing plot is a 1-acre stand of 251 white-pine and hemk trees about 120 years old, with an average height 100 feet and diameters ranging from 11 to 32 inches. e volume is estimated at 60,500 board feet, which is equivalent to an annual growth of 500 board feet during the entire life of the forest. The trees on three of the other plots had a higher mean annual growth. One of them had produced 51,000 board feet in 80 years, an average growth of 655 board feet annually. All but two of the plots were in Cornwall, Conn.

Texas Forest Service Plants Slash Pines

Sixty thousand slash pine seedlings were planted this winter by the Texas Forest Service on the Kirby Gift Forest, 4 miles south of Warren, in Tyler County, Tex. This 600-acre tract was donated to the Texas Agricultural and Mechanical College by John H. Kirby, of Houston, to be used as a demonstration and research forest.

The 10-month-old slash pines were planted to reforest areas where the natural reproduction of the young longleaf pine that covers most of the tract was not sufficient to make up a full stand. The seedlings were 6 to 8 inches in height, having been grown in the State forest nurseries near Conroe and Kirbyville, Tex., from seed obtained in Alabama and Florida. They were spaced 6 by 6 feet. The actual planting was done by a crew of 16 men of the locality who were otherwise unemployed.

Although not a native of Texas, slash pine has been successfully planted by the State forest service on various soil types in east Texas to test its adaptability to that region. A 7-year-old plantation of slash pine in a State forest in Newton County showed a growth of one-half inch in diameter during the first six months of 1932.

⁂

During the patrol season, June 1 to December 10, 1932, the Los Angeles County Forestry Department handled 471 fires, according to Spence D. Turner, county forester. Fifty per cent of the fires in county territory were controlled within 15 minutes of the arrival of the suppression force and nearly 70 per cent within 30 minutes. The record for elapsed time from discovery to arrival indicates that the crews were on 45 per cent of the fires within 15 minutes and on nearly 75 per cent within 30 minutes.

⁂

Of the 2,276 miles of firebreaks built by the State department of conservation in the northern part of Michigan, 1,589 are in the 12 State forests, 454 are in scattered areas, 213 in game refuges, and 20 miles of fire line protect the wooded areas of the State parks. The fire lines are 20 feet wide with a plowed and disked strip 12 to 16 feet wide in the center. This center strip is replowed once or twice a year. The lines serve the dual purpose of stopping fires and providing lanes for fire-fighting equipment to enter the woods.

1932 Additions to New Jersey's State Forests Include Tax-Sale Area

With the acquisition in 1932 of 15,777 acres of forest land, including a 7,000-acre tax-delinquent tract, New Jersey increased its State forest area to a total of 54,143 acres. All the recently acquired areas lie in the coastal plain region of the State and were added to existing forests. No new purchase units were established during the year.

The 7,000 acres of tax-sale land, or so-called tax land, cost the State $4,767, or 68 cents per acre. Thousands of acres more of such forest land are for sale at low prices by townships in the badly abused and run-down coastal plain region of southern New Jersey. No forest development of the newly acquired tract is contemplated for two years, since at any time within that period the land may be redeemed by the owner upon payment of tax arrears.

State ownership of New Jersey forest lands confers definite benefits upon the townships in which they lie. State-owned land is tax exempt and excluded from the area for which returns must be made by the town to county and State. In addition to this relief, the State pays the township 10 cents per acre annually in lieu of taxes, and this money, unlike tax receipts, is retained wholly by the town for its own use.

◆

At its December meeting, the Michigan Conservation Commission increased the area of the Michigan Forest Fire Experiment Station, administered in cooperation with the Lake States Forest Experiment Station of the United States Forest Service, by the addition of 3,000 acres of adjoining tax-delinquent land. The station now comprises 12 sections, or a total area of 7,680 acres, of which 4,350 acres, or 56.6 per cent, is State owned. As most of the privately owned land is one or more years tax delinquent, it is probable that the bulk of the area will eventually be deeded to the State.

New York Installs Radio Station i Patrol Plane

After a series of tests during the late fall of 1932, York State has installed in the airplane which is us State fire control work a 5-meter wave length recei and transmitting radio station. By the use of equipment 2-way continuous communication has successfully maintained for a distance of 50 miles tween the plane and a semiportable radio set ere in the Dix Hill fire tower in Suffolk County, N. Y. the same locality, 1-way communication with plane has been maintained for a distance exceedin miles.

According to Kinne Williams, superintenden forest fire control of New York State, a semiport receiving and transmitting set is to be located in a tower, and a third portable set has been obtaine the State for emergency use.

◆

Under a cooperative arrangement between Maryland State Department of Forestry and B more County officials, a number of unemployed me that county are working on the Patapsco State Fo thinning out timber as an improvement measure. crews of 15 men work two days every two we The work is under the superivsion of David Pri resident warden, and State equipment is used. return for their work the men are given credit s redeemable in food in a quantity sufficient to la family one week. The cordwood obtained is dist uted to poor families by the county.

◆

In 1922, the New York Conservation Departme tree seed requirements were 400 pounds; in 1932, 8 pounds were needed to carry out the State's plan program.

Education and Extension

Planning a Forest for the University of Idaho

By E. A. Sherman, United States Forest Service

When Dean F. G. Miller, of the school of forestry of the University of Idaho, turns from his desk and looks out of his office window, his eyes rest on the timbered south slopes of a range of hills known as the Moscow Mountains. These constitute a short secondary range, running east and west almost at a right angl and fairly well detached from the main mountain occupying the central and northern parts of the St The most striking feature of the range, Moscow M tain proper, is only 12 miles in an air line from dean's office. The area is unusually productive, a fertility carried to it in wind-borne soils from famous Palouse region. The total area compr 65,753.62 acres and is divided naturally into two ra distinct units, the Moscow Mountain unit, contai

410.79 acres, and the Potato Hill unit of 30,342.83 es. All the principal commercial forest types are l represented, with acreages as follows: White pine, 080; ponderosa pine, 20,000; larch–fir, 28,710; uglas fir, 1,390; cedar–white fir, 700. It would be d, the dean believes, to find a more nearly ideal setfor a university forest.

o obtain this area for the Idaho School of Forestry field laboratory to be studied, protected, developed, l managed by his students has long been the dream Dean Miller. Two steps toward the accomplishnt of that ambition have recently been taken. In 2 the Forest Development Co. donated to the unisity about 3,650 acres of forest land on Moscow untain. This area is already in use by the forest ool and forms a nucleus for the projected forest. e second step was taken on January 13, 1933, when presentative Burton E. French, of Idaho, introduced Congress a bill which, if enacted into law, will ble the State to acquire for its university the entire est area in question.

he plan which passage of the bill will further is ed upon the fact that the State of Idaho owns large eages of land within the boundaries of the national ests in the State. The bill authorizes the Federal vernment to acquire privately owned lands within tain described sections in the Moscow Mountains ion and extending northeastward of that region to Palouse division of the St. Joe National Forest and thward to Potato Hill (a landmark of some local minence). Boundary lines are to be so drawn as exclude farm lands and settlements and all land ing substantial agricultural potentialities. The leral Government would acquire these lands with ultimate object of exchanging them for an equal ue of the lands owned by the State within the boundes of national forests.

t may take many years to round out the entire ject, as a great many small ownerships are involved. anwhile, the State and the Federal Government eady own a part of the land. In addition to the ct donated to the university, the State owns 8,029 es within the boundary limits of the two units, and Federal Government before long will come into nership of about 9,000 acres, 200 from the public main and the balance from pending donations, king combined State and Federal holdings of apximately 20,000 acres.

The exact terms of the final exchange transaction ween the State and the Forest Service will be worked t after the Federal Government has completed the rk of consolidation and the State authorities have en empowered to make such an exchange.

◆

Chamaecyparis is represented in the Wooster Arboum of the Ohio Forestry Department by 26 species. venteen yews and six hemlocks are growing there.

Cornell Forestry Department Reorganized

Undergraduate instruction in professional forestry is to be discontinued at Cornell University as the result of action taken by the board of trustees at a meeting held in Ithaca in February. With the beginning of the next academic year, 1933–34, undergraduate students will no longer be received as candidates for a degree in forestry, and after June, 1936, all undergraduate courses in professional forestry will be discontinued. The students now registered in the classes of 1933–1936 will be carried through to graduation with the B. S. degree.

The faculty members of the Cornell department of forestry will after 1936 devote almost their full time to research and to the teaching of graduate students, candidates for advanced degrees. Only such undergraduate courses in farm forestry as may be required to round out the agricultural curriculum will thereafter be offered by the department. Extension work in forestry will also be continued.

High School Group Forms Forestry Club

A forestry club was organized last fall at the Flushing High School, Flushing, N. Y., and an active program of forest work undertaken. Among the club's projects is the planting with forest trees of an area of grassland in the Alley Pond Bird Sanctuary under the direction of a professional forester. A thousand black walnuts obtained from the American Nut Tree Planting Association have been planted by the club, and 30 seedlings from the Syracuse Forest Extension Service form a demonstration planting. Members have also pruned and improved a stand of trees on the school grounds.

An exhibit on "Forest Enemies," prepared by the club after many field trips and extensive preparation, was entered in the Children's Science Fair at the Museum of Natural History in New York City and was awarded the first prize of $25. The prize money will be used for purchasing nature-study equipment for the club.

New York State College Has Full Registration

Out of a total of 388 applicants for admission to the New York State College of Forestry, Syracuse University, last fall, 150 were tentatively accepted and 144 actually registered. A new system of selecting applicants was put into effect for the present academic year by which all applications were held until July 15, when selections were made for the entire freshman class. All those accepted had good scholastic records in their preparatory schools.

The 404 students registered at the college this year are classified as follows: 25 graduates, 57 seniors, 79 juniors, 96 sophomores, and 144 freshmen.

Welfare Activities of Michigan State College

A thinning operation carried out by the forestry department of Michigan State College on a portion of the Dunbar Forest Experiment Station near Sault Ste. Marie, Mich., just before Christmas, yielded 1,500 Christmas trees. The thinning was made primarily for the purpose of reducing overstocking in balsam and spruce stands. About 5,000 trees, averaging 6 feet in height, were cut. The 1,500 which were suitable for Christmas trees were trucked to the Lower Peninsula and given away to welfare organizations in the larger cities of the State. No attempt was made to sell them, not only because of their value as gifts to those who could not afford to buy Christmas trees but also to avoid competition with people in need of the money from the sale of trees.

Trucking these trees 400 miles cost approximately 4 cents apiece, half of the cost being borne by the taxpayers and the other half coming from private contributions. A sign displayed on the truck read: "These Christmas trees cut as a thinning in the practice of forestry to improve the forest," and each tree bore a tag explaining that "This tree was cut from the Dunbar Forest Experiment Station of Michigan State College for the purpose of improving the forest and increasing the growth and quality of the trees left standing. This tree has been inspected by the State Department of Agriculture, and declared apparently free of dangerous insect and disease pests."

Welfare labor from Sault Ste. Marie and the vicinity has been employed to cut approximately 1,000 cords of overmature hardwood in the experiment station forest. A number of large decaying maples were removed that had been crudely tapped for syrup many years ago by Indians. Several young men, otherwise unemployed, are carrying on experimental work under the station's two technically trained foresters in return for their board.

Wyoming Tree Distribution in 1932 Sets State Record

During 1932, 407,774 trees and shrubs were planted in Wyoming, writes W. O. Edmondson, extension forester. This total, the largest recorded in the State in any one year, includes 240,000 planted in nurseries in about 40 towns and cities of the State as George Washington Bicentennial plantings. These are to be set out in one to four years in memorial parks, along highways, and in school and State institution grounds.

Trees distributed in the State by the University of Wyoming under the Clarke-McNary law, from the Northern Great Plains Field Station at Mandan, N. Dak., and by the Central Great Plains Horticultural Investigations Station at Cheyenne, Wyo., totaled 167,774 during the year. These were used primarily in the establishment of farm shelter belts, windbre and wood lots.

A high percentage of survival has been shown by trees planted in Wyoming in the 1932 season. survival of the trees and shrubs planted in nurse is about 92 per cent for the first year. Records of Clarke-McNary plantings give an average surviva 89 per cent for all species. The minimum percent recorded was 67 for ponderosa pine. American e boxelder, Caragana, Chinese elm, green ash, northw poplar, Russian olive, and willow each showed a surv of more than 90 per cent, and blue spruce and cott wood of 87 per cent.

Oregon 4-H Forestry Club Work Expanding Rapidly

By Lynn F. Cronemiller, State Forester, Oregon

Since the organization of the first 4-H forestry c in Oregon, in 1931, the total number of such clubs l grown by the end of 1932 to 48 with an enrollment 428 boys and 71 girls. A 4-year project that will g club members a general understanding of forestry a some of its problems has been outlined for the clubs the State club leader in cooperation with the Fede Forest Service and the State forester.

When a club is organized a local leader is appoin and officers are elected by the members. All work carried on through the county club leader or cou agent, and the nearest State fire warden or natio forest ranger cooperates by seeing that the club has the help necessary to complete its project. A tract land must be available for the club's use, either its o or one assigned to it on a near-by national forest.

A typical club is that in Tillamook County. A tr of 80 acres of tax-reverted land suitable primarily growing trees has been given it by the county cou Since the club can not hold title to this land, it is to transferred to the American Legion Post at Tillamo which will hold it for the club members as long as th carry on the 4-H forestry project. Should the work discontinued at any time in the future, the land v revert to the county.

The tract is situated about 5 miles from the to of Tillamook where most of the club members li and 10 miles from the Pacific Ocean. It contains acres of Sitka spruce and western hemlock 12 to inches in diameter, 15 acres of mature red alder, considerable number of cascara trees, and an area open fern land which has been periodically burned the past.

Taxes and fire-patrol assessments must be paid the club. To meet these expenses, some of the r alder, which is selling for $6 a thousand board feet a near-by mill, and some of the cascara can be so Later on, the spruce and hemlock can be cut. T land is classified under the Oregon law as reforestati land, and is taxed at 5 cents per acre per year and 1 r cent of the unit market value of all forest products rvested. The fire patrol fee should not be more than cents per acre additional. The club members are rying the same responsibility as a private owner, l are thus learning something about forest taxan.

The club has reconstructed a mile of old road and ilt half a mile of new trail. Plans for a cabin are der way and some logs for it have already been cut. st year 2,500 trees were planted, including black ust, green ash, Scotch pine, ponderosa pine, Euroan larch, and Port Orford cedar. The last two species ve shown more than 90 per cent survival. All the es planted by 4-H forestry clubs are furnished from State nursery at Corvallis.

Each member of a club in Oregon is required to pare a forestry exhibit to be shown in competition the county fair. The winning exhibits are sent to State fair at Salem. At the 1932 fair the American restry Association awarded a placque to the outnding club and medals to the outstanding boy and l. The Oregon State Board of Forestry gave $100 prizes and sent the winning member in each division the 4-H school at the Oregon State College for two eks with all expenses paid.

boretum Acquired by the University of Pennsylvania

Two estates at Chestnut Hill, Philadelphia, Pa., on ich a collection of trees and shrubs was established the late John T. Morris with the cooperation of C. S. rgent and the Arnold Arboretum of Boston, have n left to the University of Pennsylvania to be mainned as an arboretum. The will of Lydia Thompson rris, who left the land to the university, also estabhed the Morris Foundation with a liberal endowment the support of the arboretum.

On the 170 acres included in the bequest are specimens of trees from many parts of the world. The collection of conifers is exceptionally fine, including Asian, African, Australian, and European species, as well as some rare evergreens of western North America.

In carrying out the wishes of Miss Morris for the administration of the arboretum, a number of graduate fellowships have been provided by the Morris Foundation for students working for higher degrees in botany. A stipend of $1,250 is granted with each appointment. Awards for 1933 were to be made in February.

Syracuse Offers Annual Course in Kiln Drying

The fourteenth annual short course in dry kiln practice will be given by the New York State College of Forestry at Syracuse, N. Y., March 20–29, 1933, inclusive, with Prof. J. O. Blew in charge.

It is the purpose of these short courses to present to the wood-using industries available information on proper kiln construction and operation and the latest scientific methods in kiln drying. In addition to lectures and discussions, students have the opportunity to season lumber in the up-to-date kiln operated on the college grounds. The course is attended by mill owners and superintendents, kiln operators, architects, and others concerned with the problems of lumber seasoning and wood use.

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Thirty-five students are enrolled in the Yale School of Forestry for the present academic year, 29 of them candidates for the M. F. degree next June. Twenty-one institutions are represented, Maine heading the list with 5 graduates and Yale having four. Students of forestry in the graduate school number 15, all but one of whom are working for the Ph. D. degree.

Forest Service Notes

anting Problems in the Virgin Islands

By E. V. Roberts, United States Forest Service

Planting activities were undertaken in the Virgin ands by the United States Forest Service early in 1 in order to determine the possibility of replacing rthless bush land, which constitutes approximately per cent of the land area of the islands, with forest s of commercial value and to encourage through onstration and experimentation the planting of s for windbreaks and pasture shade.

s the entire project was essentially a planting job, first necessity was to secure seedlings. It was racticable to attempt to establish a nursery on the islands because of water conditions—the only fresh water there is cistern water, there are no running streams, and well water has such a high salt content that it is injurious to vegetation. Therefore, an arrangement was made with the Puerto Rican Forest Service whereby seedlings were mailed from the Puerto Rican nurseries at cost plus transportation charges. The trip takes less than a day by steamer, and the seedlings arrived in excellent condition.

It is essential that seedlings establish sturdy roots as quickly as possible to resist the periods of drought to which the islands are subject. Potted seedlings were therefore used for planting stock. On the two larger islands, St. Thomas and St. Croix, sheds were erected where seedlings could be potted upon their arrival from Puerto Rico and where they could be cared for until ready for planting. Each shed was 72 by 48 feet, with concrete floor, and lath sides and top giving about 50 per cent shade. The seedlings were received in lots of 3,000 to 5,000 and were promptly heeled in at the sheds, to be taken up in small quantities as the potting work progressed. The pots used were of heavy treated paper, folded, and when opened were 1½ inches square by 6 inches high and bottomless. One man could pot about 350 seedlings in an 8-hour day. The seedlings rooted quickly and were ready for planting within a month.

The first Forest Service plantation was on a tract of 25 acres of bush land adjacent to the town of St. Thomas. So thick was the low, thorny foliage in this area that it was necessary to clear parallel trails with machetes for planting and for transporting the seedlings. Men with mattocks followed the trail swampers and dug holes, but no seedlings were planted until moisture conditions became favorable; then the entire crew would work until the prepared area was planted. Three days of clearing were required to provide sufficient area for one day of planting. Heavy rains during the planting season were extremely beneficial to the seedlings but also encouraged the growing of the bush species to such an extent that it was necessary to make a release cleaning within a month after completion of the planting work. Two more thinnings were made in the next three months.

Approximately 8,000 trees of mixed species were planted on this area, an average of 320 trees per acre. Costs were unusually high, as it was the first planting to be done on this type and the system had to be worked out and developed as the work progressed. The total cost per thousand trees planted was $78.47, and the cost per acre $24.74. In future plantings a saving of at least one-third could be made in the planting costs, but even so the cost would be beyond that warranted by the expectation value of the plantation when the uncertainties of the future are taken into consideration. Prolonged droughts and severe tropical hurricanes are of rather frequent occurrence in the islands and cause heavy losses in the forested areas, particularly of the desirable species. With such threats against the survival of plantations and the initial high cost of establishment it was not deemed practicable to continue the attempt to establish forests in the bush type. Planting activities by the Forest Service in the Virgin Islands were discontinued July 1, 1932.

The windbreak and pasture-shade experimental plantings were much more successful and gave promise of supplying a real need on the islands. The constant northeast trade winds, together with high temperatures and a comparatively low humidity, result in an excessive evaporation throughout the islands, producing semiarid conditions in the more exposed areas. In an effort to reduce the evaporation rate somewhat a system of windbreaks consisting of several rows of hardy, fast-growing trees has been developed. Similarly tree planting is recommended on the extensive areas of ture lands, to reduce the wind velocity and to pr partial shade for both grass and cattle. The F Service plantations in these types of planting were portant in determining the best species to be used the technic of planting, and also served as prac demonstrations of the value of such plantations.

Potted seedlings for all types of planting furnished free of charge to the people, approxima 10,000 plants being distributed in the first yea operation.

A large number of species was used in planting at first in order to ascertain those best suited for various types and sites. In the early bush plan 14 species were used, with Australian pine (*Casua equisetifolia*), rosewood (*Dalbergia sissoo*), West In mahogany (*Swietenia mahogani*), and various sp of eucalyptus forming the bulk of the stock. It soon found that many of the exotics which were successful in Puerto Rico were not adapted to peculiar soil and climatic conditions of the Vi Islands, so that more and more attention was g to the use of native species. West Indian mahog although not native, has been long grown on islands and is outstanding as the best general ut tree for all types of planting. It germinates rea withstands transplanting well, is very tolerant, grows fairly rapidly. When mature it is resistan disease, windstorm, and drought and produces a w of unexcelled quality. Desirable native trees inc the West Indian locust (*Hymenaea courbaril*), th (*Albizzia lebbek*), raintree (*Samanea saman*), fid wood (*Citharexylum fruticosum*), moca (*Andira inern* Gregory wood (*Bucida buceras*), manjack (Cor bay-oil tree (*Amomis caryophyllata*), and sev species of mangrove.

The forestry program in the Virgin Islands wil continued by the Insular Agricultural Station, emphasis on the development of mahogany gro windbreak planting, and pasture trees. The eq ment and property of the Forest Service, inclu the two plant sheds with a capacity for handling 100,000 seedlings each per year, have been tu over to the station, and funds have been reque from the Insular Government to carry on the prog under the station's supervision.

* * *

"Uncle Sam's Forest Rangers," radio drama dep ing the work of the Forest Service, having complete successful year on the air, is to be continued in 1 under the same arrangements with the National Bro casting Co. It will be presented in the National Fa and Home Hour program each Thursday at 12 n central standard time over stations of the Natio Broadcasting Co. east of the Rocky Mountains and Mondays in the Western Farm and Home Hour 12.35 p. m., Pacific time, over stations in the compan western network.

Aviation Activities Important in Region 1

ive projects carried on by the use of airplanes were ertaken in the Northern Rocky Mountain Region he Forest Service in 1932: Fire patrol; photographic pping; transportation of freight; count of an elk d; and a study of insect control.

ir patrol was less used during the 1932 season than ny year except 1927 since its introduction in Region No really critical fire situation developed during season, and only six actual forest patrol trips, lving 31 hours 25 minutes flying, were made. In instance, the exact location of a very threatening ll fire, which was in doubt, owing to an incorrect , was promptly discovered by the plane. The und report of the lookouts was more than a mile in r.

4-year program of aerial photographic mapping set up for this region in 1932, estimates of the cost which were based on costs of similar work done on Kootenai Forest in 1930–31. This program is ject to the vicissitudes of the use of planes for fire trol work. The plan outlined the photographing in 2 of 1,075 square miles at an expected cost of $7,843. actual accomplishment for the season was more n 3,000 square miles photographed for $7,446. s was practically three years' work, as called for by program, at the cost of one. It was made possible he decrease in costs of flying, film, and photographic nts. The cost of the plane and pilot dropped from an hour in 1931 to $16.44 in 1932; film dropped n $35 to $30 a roll; and prints from 12½ cents to 8 ts each. In addition to these savings, the sub- ution of 8¼-inch focal length lens for the 12-inch formerly used reduced flying time, the number of ures needed, and the amount of developing, print- , and compilation. A new camera assembly was chased, the cost of which was not included in the son's aerial photographic expenses. The average t of the photographs was less than 8 cents per print compared to 20 to 30 cents formerly.

Howard R. Flint, regional forest inspector, was in rge of the mapping. The past season's experience, believes, indicates that the future of aerial photomap k in forestry is assured and that its more general ption is a matter of time and further dissemination knowledge in regard to it. By no other means can h reliable drainage, culture, and general cover maps secured at comparable costs or with anything like accuracy and rapidity of this method. The prints m a reliable and permanent record of the appearance definite area of terrain at the time the picture was en, and the maps compiled from them are superior those made by any other method.

Aerial transport of forest freight is beyond the experi- ntal stage in Region 1. Its development depends efly upon the further reduction of cost and the provision of greater numbers of negotiable landing fields in the more remote parts of the region. In 1931, 116,000 pounds of freight went to Holbrook Field near Big Prairie Ranger Station in the Flathead National Forest; in 1932, 93,352 pounds. The air service was prompt and satisfactory and made possible early delivery of material for spring work regardless of late snow or high water. The cost in 1932 of 3.8 cents per pound is contrasted with a probable 7 cents for ground transportation.

A unique use was made of aerial transport on the Coeur d'Alene Forest in February, 1932. Three thousand pounds of hay was delivered to snowbound parts of the forest for the relief of starving deer. Small bales of hay dropped from the plane were pulled out of the snow by men on the ground and distributed to the deer.

Count of the Sun River elk herd in the Lewis and Clark National Forest was undertaken in March, 1932. The project was experimental and from the point of view of actual achievement of the purpose was a failure. From the attempt, however, several things were learned, and the project will be undertaken again in 1933. A time will be chosen when practically all the elk are out in the open; a certain type of clear day will be selected for the flight; and a more suitable plane will be used.

Two flights were made in 1932 for the Bureau of Entomology's forest insect field station at Coeur d'Alene, Idaho. Special insect traps were attached between the wings of a biplane, with the object of learning more about the flight habits and migration of *Dendroctonus monticolae*. Results were not conclusive because of the short flying time for which funds were available.

Effect of Forest Cover on Snow Melt

By Charles A. Connaughton, United States Forest Service

An acute watershed problem is presented by the distinctive combination of climatic and topographic features of southwestern Idaho. In this region the productivity of tillable land in the valleys is largely dependent on irrigation water which has its source in the near-by mountains. The ability of a watershed to deliver ample supplies of usable water largely measures its value from an irrigation standpoint, and a large part of this water is derived from snowfall.

In response to recommendations made in 1929 by irrigationists dependent on the watersheds of the Payette and Boise Rivers who believed that drastic restriction of timber cutting and of other forest land uses was necessary to abundant water supplies, a study was begun by the Intermountain Forest and Range Experiment Station on the effect of cover conditions upon the rate at which the accumulated winter snow melted. Five plots were established at McCall, Idaho, in 1931. They were of similar soil, slope, elevation, and exposure and were within a circle having a half-mile radius.

Each plot represented a distinctive condition, including bare ground; sagebrush; a stand of reproduction of ponderosa and lodgepole pile 20–30 feet tall; a typical overmature, clean-floored ponderosa pine stand; and an overmature stand of ponderosa pine with a heavy understory of young growth. To insure exact and uniform measurement of the snow conditions, 15 to 35 snow-measurement stations were established on each plot by a gridiron system, the number of stations varying with plot conditions. Measurements were also made along compass-line survey courses over a large area, along which lines conditions similar to those of the plots were found. Observations at 2-day intervals were begun in the late winter when there was a maximum accumulation of snow. These continued throughout the melting period. Weather data were taken in the open and in the dense timber.

In 1931, a year of light snowfall, the maximum water content of the accumulated snow under the heaviest crown canopy was 73.5 per cent of that contained in the snow on bare ground in the open. This is in contrast with conditions in 1932, a year of average snowfall, when on the reproduction plot the water content of the accumulated snowfall was 95.7 per cent that in the open.

This study brought out sharply the fact that the crowns of the trees had much to do with the accumulation of winter snows. It was found that under the crowns of mature trees the accumulated water content of the winter snow was only approximately 67.4 per cent of that in the open, while under crowns of immature trees (less than 80 years old) the water content of the snow was 78.6 per cent of that in the open. This indicates that the influence of tree crowns is proportional to their size and density. The snow in openings within the forest contained approximately the same amount of water as that in the open field.

Analysis of the records taken at the two weather stations showed that the rate of melting was materially influenced by both temperature and wind and that the effect of a given temperature and wind velocity was the same in the open as in the timber. Correlating these weather factors with periodic water content of the snow it was found that for the two years recorded 91.18 per cent of the variance in the change in water content from period to period was due to variation in temperature and wind, and the remaining 8.82 per cent to other and as yet unmeasured factors. Soil temperature at a depth of 2 to 3 inches under the snow consistently remained between 32° and 33° and did not cause appreciable snow melting.

The retarding effect of the forest cover on the melting of snow was very marked. At the time that the snow disappeared from the bare ground and sagebrush areas, snow which contained 5 to 20 per cent of its total original water content still persisted in the forest. Melting was retarded 3 to 10 days under the forest canopy, the heaviest forest cover holding the snow the longest.

This preliminary study has indicated several fa Interception of winter precipitation by tree crowns an important bearing on the water content of accu lated snow; forest cover materially affects temperat and wind, and thereby greatly decreases the rate snow melt; the snow cover lies longest in the for and a sagebrush cover is not much better than b ground in retarding snow melt.

Freezing Out the Western Pine Beetl

By E. E. Carter, United States Forest Service

In December, 1924, severe and prolonged c weather broke up a bad epidemic of the western p beetle (*Dendroctonus brevicomis*) in *Pinus ponder* within the Deschutes National Forest, Oreg., a caused varying degrees of mortality in the bro throughout northern California and southern Oreg Research by the Bureau of Entomology showed th prolonged exposure to subzero temperatures wo cause losses among insects of this species in all of th forms, with practically complete kill resulting fr exposure to cold of −10° F. or lower. Insects from t northern portion of the range of the species were m resistant than those from California. Some ot species of the same genus, such as *D. monticolae*, w found to be uninjured after subjection to temperatu which killed *D. brevicomis*.

The next low temperatures of similar intensity a length in northern California and south-central Oreg occurred December 9–12, 1932. The effect on kno epidemics of the western pine beetle is being carefu studied by officers of the Bureau of Entomology and the Forest Service. Bark samples from infested tr have been taken to laboratories, carefully shaved expose the insects in them, and the condition of ea insect determined. The results from infested ar where the subzero temperatures were most severe a prolonged indicate that more than half of the inse were killed. Samples collected in January or ea February show a higher percentage of mortality amo the insects than did samples collected immediat after the cold snap. Also, the insulating effect thick bark is very apparent in that the kill may ha been almost complete along the upper portion of t stem of a tree, where the bark was less than an in thick, but only 50 per cent or less in the thick bark the lower stem, as at breast height.

The degree to which this freeze of 1932 has reduc the widespread and destructive epidemics of t western pine beetle in Oregon and northern Califor can not be fully determined until next summer. Ho ever, several insect control projects on the national f ests and on private lands have been stopped or will not started because they are now considered unnecessa The degree of killing was irregular in northern Ca fornia and the freeze did not reach the southern Sie at all, so that control work on an especially b infestation on the San Joaquin drainage is still essenti

Virgin Forest in Pennsylvania Yields Research Results

By A. F. Hough, United States Forest Service

Pennsylvania's original forest growth has almost nished as the result of clearing for agriculture, comercial logging, and forest fires. In the northwestern rt of the State a few remnants of virgin areas yet ist within the Allegheny National Forest. The rgest of these is about 6,000 acres of hemlock-hardood forest owned by the Central Pennsylvania Lumr Co. in Warren and McKean Counties, Pa. In 30, a 5 per cent strip cruise of 1,200 acres was made this tract to determine the characteristics of such a rest before it too fell under the ax. A tally of the ecies, size, and reproduction, as well as the shrubby d herbaceous vegetation, was made by a 4-man field rty of the Allegheny Forest Experiment Station. he nature of the topsoil was sampled at 2-chain tervals along cruise strips and photographs were taken the tract.

The principal species on the area are hemlock and ech, the latter in general forming the understory. ecies of less importance, though found in all size asses, are sugar maple, yellow birch, red maple, ack birch, and black cherry. More rarely white ash, llow poplar, cucumber magnolia, basswood, and nwood are present. Black cherry, white ash, yellow plar, and cucumber magnolia require light and growg space for their development. Past windfalls and e group-dying of large hemlocks result in opening the forest so that these species may exist alongside the hemlock, beech, and sugar maple, which are pable of reproducing under the unbroken shade of virgin area.

Judging by ring counts on stumps left in the areas ready logged, the mature hemlock trees are 250 to 0 years old. This species attains a diameter of arly 50 inches 4½ feet above the ground and a height 125 feet. All of the hardwoods, except black birch, sswood, and ironwood, reach diameters exceeding 30 ches and heights of 120 feet.

The soil is a loamy sand or clay loam, often with any sandstone rock fragments, and the top layers e ash-gray in color from leaching by the acid hemlock ff layer. This leaching commonly extends down from inch to 3 inches, but in a few samples leached layers ere 6 to 14 inches deep. In humid northern climates is leaching, or podsolization, is a common soil phemenon, especially under coniferous forests, and may a severe handicap to the establishment of young edlings.

When this area is logged practically the same condin will exist as if a tornado had swept away the forest. y noting various stages in the regrowth of past windvept areas, the type of forest which will return can be edicted. The young growth of seedlings and older trees spared by wind or logging are the nucleus of the future stand. In general, all the hardwoods grow more rapidly in the seedling stage than hemlock, and the next crop is almost sure to be made up of a mixture of beech, red and sugar maple, black and yellow birch, black cherry, white ash, and some minor species. Hemlock seedlings of the same age as or older than the hardwoods will be overtopped and it may take a period of 100 or more years before they gradually usurp the place of the hardwoods.

The study of this virgin area has shown that at least three natural tendencies which influence the species and soil of forests must be recognized and taken into account in planning future management:

(1) All the factors of climate and soil are working toward the reestablishment of a forest in which hemlock and beech are prominent species. Under fire protection hemlock will continue to increase in amount, and this important native conifer should be favored in future forests. Beech, however, is less valuable than sugar maple, economically, and special methods of cutting second-growth forests must be discovered in order to discourage beech and secure the establishment of species with greater market value.

(2) By rotating crops of pure hemlock and the hardwoods or by producing a mixed hemlock-hardwood forest, the tendency of top-soil layers to leach will be checked and there will be less chance of a hardpan forming at lower levels. Better tree growth should result from such mixed stands, and proper management will give rapid decomposition of leaf-litter and a less acid soil.

(3) Cutting methods which approach the natural opening of a stand by windfall or decay will probably give best results. A group selection felling or clear cutting in strips or patches (not too large) will perpetuate valuable space-demanding species, such as black cherry and white ash, in almost as great abundance as they now exist in second growth which has followed clear cutting. Shade-enduring beech, hemlock, and sugar maple would eventually crowd out other species unless such a cutting method were used.

Burned Watershed on the Santa Barbara Forest Seeded from the Air

To prevent erosion on 2,000 acres of recently burned, mountainous watershed in the Santa Barbara National Forest, this area was seeded by airplane with mixed mustard and clover seed in November, 1932. The contract for this work was awarded by the Forest Service to the United Air Service (Ltd.), and Hewitt F. Mitchell of that company was assigned the tasks of designing a special seeding hopper, supervising its manufacture and installation in an airplane, and flying the plane for the actual seeding.

Since so far as could be determined mustard and clover seed had never before been sown in this manner it was necessary to determine the proper type and size of hopper, and to design a shut-off valve to control the release of the seed and a mechanism that would remove the seed from the hopper and spread it evenly below the plane. Similar operations in crop dusting had shown that eddy currents below the plane tend to force the seed back into the hopper.

The airplane used was a standard Stearman biplane with a Wright Whirlwind engine. The hopper was constructed of galvanized iron to fit the front cockpit with the bottom sloping in to a 6-inch by 1-inch opening, running crosswise of the ship, and fitted into a funnel which carried the seed through the floor. A valve, consisting of a sliding plate between two fixed plates, released or cut off the flow of seed, and was operated by a lever from the rear cockpit. The seed was emitted through a Venturi tube below this valve.

Before the sowing was begun, tests were made to determine the most effective altitude from which the seed should be dropped and the correct manipulation of the seed valve. Warren T. Murphy, assistant supervisor of the Santa Barbara National Forest, conducted the ground observations during the tests. An altitude of 300 feet was decided on as giving the best spread of seed. To sow the desired 9 pounds of seed per acre, it was found necessary to open the valve fully.

In sowing the seed, 40 trips were made from the operation base at Carpinteria, Calif., to the Juncal and Agua Caliente areas of the Santa Barbara Forest. The average time per trip was 30 minutes, including the 12-mile flight from the base, the actual seed dropping taking about 5 minutes. About 450 pounds of seed were carried per load, enough to cover 50 acres if evenly distributed, but on Mr. Murphy's advice a heavier crop was sown on the lower, barer areas than on the higher and rockier sites. Four days were required to complete the sowing of the 18,000 pounds of seed provided for the job.

Beetle-Infested Timber Supplies Fuel and Work to Unemployed

By A. C. Austin, United States Forest Service

Fuel for 300 needy families of Missoula, Mont., has been supplied this winter through the removal of beetle-infested timber from the Fort Missoula district of the Lolo National Forest. The district during the past three years has sustained a heavy loss in second-growth ponderosa pine 2 to 8 inches in diameter and an appreciable loss in mature trees as the result of the pine-bark beetle infestation. About two-thirds of the infested timber had been removed by February, and the loss from beetles and from the resulting increased fire hazard should be greatly reduced.

The Fort Missoula district, comprising about 1,250 acres, was set aside in 1878 as a timber reserve for Fort Missoula. More recently the district was transferred to the Lolo National Forest for fire protecti and administration, subject to the needs of the W Department. For the past six years it has been und special-use permit to the University of Montana Fore School for use as an experimental forest and fie laboratory. It is under the supervision of the fore school that the unemployed of the vicinity have bee permitted to remove and use for fuel the infested timbe

Additional work will be provided for about 250 me for 10 days each through the use of Reconstructi Finance Corporation funds which have been obtaine to provide for experimental thinnings on 90 acres of t same forest. Pay for this work is $3 per day in orde to local merchants for clothing and groceries or f urgent medical attention. It is estimated that abou 900 cords of wood will be obtained from these thinning Brush resulting from the cutting will be piled and burne currently and the wood left ready for hauling under fre use permits to needy families. The officials of Fo Missoula are cooperating by awarding a contract f cutting and hauling 90 cords of wood from the area f fuel at the fort. Most of this will be obtained fro overmature and mistletoe-infected Douglas fir adjace to the experimental thinnings.

These projects will increase the value of the area as a experimental forest as well as contributing to the we fare of the community.

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Both in artificial reforestation and in leaving see trees for natural reproduction it is desirable to kno whether seed from a young tree will produce bette seedlings than that from an old tree. To answer thi question, among others, seed was collected by th Forest Service in 1921 from both young and old tree in various parts of the Douglas fir region, and experimental plantations were established on four nationa forests. Height measurements have been made periodically on several thousand of the seedlings, and th results now in process of compilation indicate that th age of the tree from which seed is collected has n effect on the growth and development of the plante seedlings.

* * *

Nearly three-fourths of the area burned on th national forests during the 1932 fire season was i California, where one fire alone swept over 220,00 acres in the Santa Barbara National Forest, accountin for more than half the total burned acreage. In al other regions great reductions from the totals of las year were recorded in area burned, suppression costs and damages. Comparison of the figures for the tw years shows: Area burned in 1932, 397,722 acres—1931, 605,073 acres; fire-fighting and protection expenses, 1932, $986,886—1931, $4,219,174; propert damage, 1932, $384,355—1931, $4,409,309.

General Forest News

Unexplained Abnormalities in Forest Trees May Be Due to Virus Diseases

By Carl Hartley, United States Bureau of Plant Industry

Although such knowledge as we have of the virus iseases of woody plants has been gained mainly from e more intensively studied fruit trees and shrubs articularly the stone fruits and brambles), diseases f the virus type are known to exist in two timber ecies—the sandalwood of India and the locust of the nited States. It seems reasonable to suspect that me of the abnormalities of other forest trees may be ttributable to this cause.

Numerous infectious diseases of man and animals, nd a still larger number in herbaceous plants, have een attributed in recent years to filterable viruses. hese are somewhat hypothetical entities which have ever been seen and which can be made to pass through orcelain filters without loss of virulence. Their bility to increase and their sensitivity to heat would dicate that they are living organisms. However, hey are more resistant to both heat and poisons than re most living things, they can not be grown on artifiial media, and there is some support for the view that hey are inanimate chemical products of the host tis ues.[1] Yellow fever, smallpox, foot-and-mouth disease, og cholera, the wilt disease of the gypsy moth, mosaic iseases of various plants, and the degeneration diseases hat give rise to the belief that potato varieties "run ut," are among the well-known disorders for which iruses are accepted as causal agents. Even the acteria are subject to virus diseases, if the belief of a umber of investigators of bacteriophages is correct. he recognition of virus diseases in crop plants has ade it possible to explain many cases of subnormal ield that had previously been laid to physical, chemial, or genetic factors. It may be that some of the ariability, abnormality, and mortality in trees which ow vex foresters are caused by viruses.

In none of the woody plants studied has it been ossible to transmit virus diseases by transfers of exressed sap; successful experimental transmission has epended on actually grafting or budding tissue from diseased plant on a healthy one. The filtrability of he supposed viruses of woody plants has, therefore, et to be demonstrated. For both herbaceous and mall woody plants, sucking insects appear to be the rincipal agents of natural spread; the discovery of ransmission by leaf-hopper of the peach "yellows" hich ruined many peach orchards during the closing ears of the last century has just been announced by Kunkel. This is the only case in which the natural transmission of a virus disease of trees has been found.

The best-known disease of this type in forest trees is the spike disease of sandalwood, described in the September, 1932, issue of the Indian Forester as one of India's major forest problems. It has been made the subject of special annual conferences in that country, the seventh of which was held in 1932. The presence of the spike disease reduces the sandalwood output by about half. Its transmissibility by grafting was demonstrated in 1917, and the technic of experimental transmission has now reached the point where only a few milligrams of diseased tissue need be used if a true union with the stock takes place. Much effort has been expended on the search for insect carriers, but the method of natural transmission remains to be determined. The situation is complicated by the fact that sandalwood is itself a parasite on the roots of other plants. Sreenivasaya[2] states that the disease is particularly destructive where species of legumes are serving as hosts for the sandalwood; when attached to certain nonleguminous hosts the sandalwood is nearly immune.

In view of the foregoing, it is interesting, though probably a mere coincidence, that the only other timber species on which a disease of the virus type has been described is leguminous. A systemic disease of *Robinia pseudacacia* already recognized by a number of foresters appears to have been the first disorder of this type reported on a timber-producing species, attention having been called to it in a brief and generally ignored note in 1898. The disease is characterized by the development of conspicuous witches' brooms—clusters of twigs bearing large numbers of very small leaves. These usually develop from exposed roots or at the tips of 1 to 2 year old sprouts. Brooms sometimes break out in the crowns of older trees, developing mainly in the late summer after normal growth has ceased for the season. Trees live only a few years after the first appearance of brooming in the crown. Evidence of the graft transmissibility of the disease and citations to some other literature on virus diseases of woody plants are given by Jackson and Hartley in the January, 1933, issue of Phytopathology.

It is believed that the recently recognized "phony" disease of the peach, described by L. H. Hutchins in the United States Department of Agriculture Yearbook for 1927 (pp. 499–503), and proved infectious by him, is particularly significant for forest pathology. It represents for woody plants the obscure type of virus disease that must be kept in mind in any thorough examination of puzzling cases of abnormal or subnormal plant growth. The infective principle in this disease is entirely limited to the root, though the effects appear in the top. The symptoms are not so conspicuous and easily recognized as are those of the locust disease. Diseased trees differ from normal by having leaves of a darker green, fewer and smaller fruits, shorter and more numerous twigs, narrower annual growth rings, earlier blooming, and later leaf fall. As with the locust disease, the difference between normal and diseased trees is most conspicuous under conditions that favor vigorous growth. Doctor Hutchins states that incipient cases can be diagnosed with certainty only by applying a chemical reagent to the wood of the root. Diseased trees live as long or nearly as long as those not infected. Although they lose their profit-producing capacity, the departures from normal growth habit are so slight that for 40 years the poorer yield was attributed to other causes. With a species less intensively cultivated than the peach, the trouble might easily have gone for a century undetected.

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[1] Schultz, E. W.: The Ultrascopic Viruses from the Biological Standoint. Scientific Monthly 31:422–433. 1930.

[2] Sreenivasaya, M.: Present Position of the Problem of Spike Disease. Current Science 1:126–127. 1932.

It is evident that symptoms as inconspicuous as those of the phony disease can be recognized only by men who are thoroughly acquainted with the normal aspect of the tree. The forester, in the nature of things, is particularly familiar with the timber species of his region and is in a good position to detect suspicious conditions. It is probable that some of our forest tree groups, like the citrus and pome fruits, have no virus diseases that can be readily detected, but among the many species of commercial trees careful search should discover numerous abnormalities of the virus type. Mottled or otherwise unusually colored leaves, curling or crinkling of leaves, marked changes in habit or rate of growth, growth at abnormal times of year, and particularly the shortening and multiplication of twigs, are to be viewed with suspicion when they can not be correlated with soil or weather conditions, and especially if two or more such symptoms appear in association. Symptoms due to virus infection commonly appear almost simultaneously in different parts of the plant, so that troubles limited to certain branches are usually due to other causes. A generally poor condition of a tree is reason for suspecting virus disease only if there is considerable difference between adjacent uncrowded trees of the same age and under the same conditions; uniformly subnormal growth of an entire stand of seedling origin or suppression of individuals in a crowded stand would not justify suspicion of virus activity; sudden death of otherwise normal-appearing trees should not be suspected of resulting from virus infection; and in no case can a condition be finally accepted as a virus-type disease until infectiousness has been demonstrated.

If foresters will call to the attention of pathologists cases of abnormalities that are not readily explainable on other bases, they will help to develop our knowledge in a practically untouched field.

New Nursery Method Described
Syracuse Nurserymen's Conference

Among the 13 interesting papers presented at
conference of forest nurserymen of the Northeast
States held at the New York State College of Fores
at Syracuse, N. Y., last November, was one describi
a new method of producing root-pruned, 3–0 planti
stock. This method, which on the surface does
sound so revolutionary as it actually is, has been us
at the Pack Demonstration Forest at Warrensbu
N. Y., and was described by C. H. Foster of that fore
It is, briefly, as follows:

The nursery soil at the Pack Forest is light and sand
The seed beds are carefully leveled and prepared a ye
in advance, and the weeds that spring up during t
summer are burned several times with a Hauck torc
Weeding costs after the beds are occupied by seedlin
are greatly reduced by this preliminary burning. T
seed are sown in drills for a production of from 30
60 seedlings per square foot. Species used are whi
and Norway pine and Norway and white spruce.
June of the third year the seedlings are root-pruned at
depth of 1½ inches below the surface of the bed. Th
extremely shallow root-pruning is made possible by t
development of a specially designed pruner. Accor
ing to Mr. Foster, it is possible with this tool to pru
as close to the surface as three-fourths of an inch, b
experience so far has indicated that 1½ inches is t
desirable depth for the species used. This treatme
produces stocky seedlings with strong, spreadin
shallow lateral root systems.

Planting tests on a variety of sites on the Pack Fore
indicate the following advantages for this class of sto
as compared with ordinary transplant stock of t
same age: (1) Lower cost of production; (2) ability
the stock when planted to start growth immediatel
both in roots and tops; (3) ability to withstand droug
by getting moisture from a larger area and by t
capacity of the roots to grow both laterally and
depth immediately after planting, because of the wid
spreading lateral root system; (4) better ability to co
pete with ground cover and brush because of great
height growth the first season after planting; and (
reduced danger of frost heaving on account of t
widespreading, shallow root system.

New Lespedeza Promising for Norther States

A new, hardy, drought-resistant strain of Kore
lespedeza (*Lespedeza stipulacea*) now being tried out
the United States Department of Agriculture promis
to extend the northern limit of the range of this valuab
pasture plant in this country 200 or more miles farth
north. The new strain was discovered growing wi
in Harbin, Manchuria, by P. H. Dorsett, of the Bure

Plant Industry. For three years it has been grown the department's farm at Arlington, Va., at Middle- ry, Vt., and at Augusta, Mich. Successful experi- ental plots have also been established in Connecticut, assachusetts, New Hampshire, Minnesota, New ork, and Wisconsin.

The new lespedeza should fill a big gap in New igland and other northern pastures, particularly since grows well in the type of acid soil commonly found that region.

ational Forest Reservation Commission Summarizes Accomplishments

By John E. Burch, United States Forest Service

In its report for the fiscal year 1932, the National rest Reservation Commission reviews in detail its rk during that year and also briefly surveys the sults accomplished during the 21 years which have psed since the purchase of land for national forest irposes was initiated by the passage of the act of arch 1, 1911, commonly known as the Weeks law.

The commission during these 21 years has approved r purchase 4,727,680 acres of land at an average price $4.49 per acre, or a total of $21,203,021.93, and title s been acquired to 4,369,656 acres at an average price $4.55 per acre, or a total cost of $19,899,792.15. is leaves an area of 358,024 acres approved for pur- ase but not yet acquired. The remaining unacquired ea involves an obligation of $1,303,229.78 and is ing acquired at an average price of $3.34 per acre. proximately 62 per cent of the area in question is or ll be involved in friendly condemnation suits insti- ted in order to clear title. The United States title torneys are now engaged in preparing abstracts of le for the remaining 38 per cent of these unacquired nds.

Twenty-one purchase units have been established imarily for the protection of the watersheds of navi- ble streams, and 20 purchase units primarily to imulate timber production through the determination d demonstration of the forest practices and principles silvicultural management best adapted to the regions which they are parts. However, the watershed units so have high timber productive values, while the nber production units contribute to stream-flow bilization. As the lands have been acquired they ve been protected, improved, developed, and sub- cted to constructive principles of management and use.

The commission's program is only half accomplished. ithin the 41 existing purchase units 9,292,303 acres main in private ownership, and it is roughly esti- ated that of this unacquired land approximately 539,900 acres should be acquired by the United States order that the purposes underlying the establishment the purchase areas can most effectively be fulfilled. urchase units have been established in the States of labama, Arkansas, Florida, Georgia, Louisiana, laine, Michigan, Minnesota, Mississippi, New Hamp- ire, North Carolina, Oklahoma, Pennsylvania, South Carolina, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin.

During the fiscal year 1932 the commission held two regular meetings. The total acreage approved for purchase at these two meetings amounted to 83,086 acres at an average price of $2.48 per acre, or a total of $206,458.45. Title was acquired by the Government to 362,274 acres at an average price of $3.34 per acre, a total cost of $1,210,232.12. These prices, compared with the average price of $4.51 per acre for all prior approvals and $4.66 per acre for all lands acquired during the preceding fiscal years, clearly illustrate the downward trend of land values throughout the eastern portion of the United States.

Establishment of three new purchase units in Wisconsin—the Chequamegon, embracing 361,497 acres in Ashland and Sawyer Counties; the Mondeaux, embracing 171,832 acres in Taylor County; the Oconto, embracing 203,418 acres in Oconto and Langlade Counties—and of an addition to the existing Oneida unit in Wisconsin embracing 68,055 acres in Forest and Vilas Counties, was approved by the commission. These units were established with the understanding that the commission would not approve the purchase of any lands within their boundaries until such action is warranted by available appropriations and the desirability of these lands in comparison with those in other units. The primary reason for thus defining the ultimate purchase program of the Federal Government in Wisconsin in advance of the appropriation of funds for the purchase of the lands designated was to aid the State, counties, and private agencies in the formulation of a State forestry program.

The commission also approved the reduction of the Osceola purchase unit in Florida to a gross area of 161,813 acres as representing the maximum area desirable for Federal acquisition in that particular region, and the transfer of a portion of the Kiamichi unit embracing 201,480 acres to the Ouachita unit in Oklahoma for administrative reasons.

Model to Demonstrate Growth of Twig

A twig 7¼ feet in diameter that puts on a year's growth in a minute and a quarter will be exhibited at the Centry of Progress Exposition in Chicago this summer. This huge model represents a ¼-inch, 3-year-old basswood twig, every mircoscopic detail of which is shown in cross section. The "growth" is accomplished by a mechanical process which increases the diameter 18 inches, adding "wood" on the inside and "bark" on the outside of the growing zone.

Each cell of the three annual rings of the wood, with its central pith and the radiating pith-rays, is outlined. At the circumference, between wood and bark, is the cambium layer. The fourth year's growth is shown by a series of sliding plates and moving pieces of canvas which take 75 seconds to come completely into view. The process can be reversed and the model restored to its original size, ready to "grow" again.

Knowledge of Properties and Uses of Groundsels Increasing

By W. A. Dayton, United States Forest Service

A recent report by A. B. Clawson, physiologist of the Bureau of Animal Industry, in the Official Record of the United States Department of Agriculture, brings to attention the steadily growing volume of ascertained facts regarding the rôle of certain members of the genus Senecio in domestic livestock poisoning. Mr. Clawson describes feeding experiments with *Senecio longilobus*, a groundsel of the Southwest, results of which demonstrated this species to be one of the more poisonous of the groundsels and dangerous for grazing livestock, particularly cattle.

The properties and uses of this vast genus are varied and invite further research. It is one of the three largest genera of flowering plants and is fairly well developed in this country, where more than 200 of the 2,600 known species occur. The Rocky Mountain region in general and Colorado in particular appear to be the center of distribution for the United States. In some parts of the world species of Senecio attain tree size. A number of species are garden ornamentals, while others are classified as noxious weeds. Seve species are reputed to possess medicinal properti and a number are apparently innocuous food plants man and beast. One species, indeed, tall butterwe (*S. serra*), has recently been used for range reseedi on the Uinta National Forest, Utah, according Ranger Edson J. Adair.

The roster of groundsels known to be poisonous steadily increasing, with reports of losses of catt sheep, and horses in many parts of the world. M are known to have been fatally poisoned by two speci of Senecio in South Africa.

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The forced-draft electrical burner for destroyi stumps described in the November, 1932, FORE WORKER as being in use in the Frasier Valley, Briti Columbia, was developed by R. N. Miller, extensi economist in land clearing of the State College Washington and the United States Department Agriculture. The device is widely used in the weste part of Washington. Two bulletins describing its u have been issued by the State College extensi service, and Mr. Miller gave a demonstration of tl burner in the Frasier Valley in the summer of 1932.

Foreign Notes

Forestry Activities in Mexico

In the bulletin of the Pan American Union for January, 1933, appears the following account of forestry progress in Mexico:

> The conservation of forests and the problem of reforestation have for many years received much attention in Mexico. The Mexican Forestry Association was established in 1922, and its work during the past 10 years is indeed worthy of the highest praise. It promoted the celebration of national Arbor Day, an initiative which found hearty support throughout the nation. During the last three years the celebration has been extended to include the week of February 14–20, any day in which may be observed locally as Arbor Day. Official recognition was given this celebration by a presidential proclamation issued in 1932. The General Bureau of Agriculture is conducting through its regional agents in the various sections of the country an active campaign for the promotion of reforestation. * * * A technical course in reforestation has been added to the curriculum of the vocational school at Tlalpam. This course is to be supplemented by practical experiments to be conducted on land furnished by the General Bureau of Agriculture.

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The Hebrew University, Jerusalem, has received a gift of land from Solomon Lamport of New York to be used for the establishment of a botanical garden. Native vegetation and a collection of the flora of other sections of the Near East will be cultivated.

Importation of Wood Products into Norway Restricted

Import restrictions placed on certain wood produc by Norway for the protection of the Norwegian lumb industry have been extended, by a royal proclamatio of October 28, 1932, to plywood and veneered panel Importation of all sawn and planed lumber into tl country without the permission of the forest branch the department of agriculture was forbidden by a order of July, 1931.

The law authorizing the placing of these restrictio was passed in 1918 and provides that the king or h delegate can forbid the importation of any produ until further notice. Up to the present time lumbe and wood products only have been affected. Th immediate cause of the action of July, 1931, accordin to the Norwegian Forest Director, was a plan of th Russian Soviet Government to ship large quantitie of sawn and planed lumber to Norway and to establis consignment depots at various places along the coas Since the Norwegian legislative body, the Storting, wa not in session at the time and it was therefore no possible to obtain any increase in the import tarif recourse was taken to the 1918 law, which had not bee used for many years. The action taken by the depart ment of agriculture was approved by the Stortin during the 1931–32 session, and the present restriction will probably be maintained until conditions in th mber market become more favorable. Under the esent system, as compared with the imposition of gher tariffs, the lumber industry can be protected thout increasing the price of those types of wood and mber which it is necessary or desirable to import.

In considering applications for import permits, the ciding factor is whether or not the same lumber, or a tisfactory substitute, can be obtained locally. In neral, no permits are issued for the importation of oducts which compete directly with local lumber. tension of the restrictions to include plywood and neered panels for furniture making was made imarily to protect the Norwegian plywood industry om competition from Finland and the Baltic coun-es, which were beginning to ship in considerable antities of birch plywood.

These measures have so far had little effect on lumber ports from the United States, which consist chiefly hardwoods and hardwood products. The amount of ywood exported from this country to Norway is tremely small and consists largely of special types ich can not be obtained there. It is not expected at any action will be taken to limit the imports of rdwood flooring, which would more seriously affect nerican interests.

Private Forestry Societies in Sweden

A member of the Royal Swedish Forestry Depart-ent, F. Aminoff, writing in the Quarterly Journal of orestry of the Royal English Forestry Society for Jan-ry, 1933, discusses the private forestry societies in eden, whose work he considers a very important fac-r in the care and management of Sweden's forests. e principal societies are the Swedish Forestry Society, e Norrlandian Forestry Union, and the Forestry ciety. Mr. Aminoff, after a brief survey of the extent d value of the forests of his country, describes these ganizations as follows:

The Swedish Forestry Society was founded in the ar 1902. It was started at a time which for Swedish rest economy has been of far-reaching importance. e need of efficient protection and safeguarding of the untry's forest resources and the establishment and eation of forest management, based upon native search, became more and more accentuated and re-lted in a general forest act, applying to the private rests, and in the organization of the State Forest search Institute. The interest in questions relating forestry found expression in an endeavor to form by mbination and cooperation a body which might be le actively to look after and further the development forestry in the country.

The Swedish Forestry Society has made it its task, ongside the State's own organs, to work for the vance and improvement of forest economy. By ganizing meetings and excursions the society gives portunity for discussions on and information about w achievements in forestry.

Every person interested in the association's aim and rpose is entitled to membership. Its business is in e charge of a committee, and its registered office is in Stockholm. The committee consists of 10 members, elected for a term of three years.

Meetings are organized annually in Stockholm, generally in the course of the month of March. At these meetings lectures are delivered on subjects of major importance for Swedish forestry. * * *

Apart from minor, popularly written, pamphlets, which have been printed in large editions, the society regularly publishes periodicals: Svenska Skogsvårdsföreningens Tidskrift (The Swedish Forestry Society's Journal)and Skogen (The Forest). * * *

The society's work is carried on first of all by membership fees as well as subscriptions and revenue from advertisements. Furthermore, it might be mentioned that the society is in receipt of a state grant—of late years 13,000 kronors annually—and contributions from companies and corporations such as the Swedish Timber Exporters' Association, the Swedish Cellulose Association, the Swedish Wood-Pulp Association, the Swedish Paper Mills' Association, and others. * * *

The society's membership has on the whole been constantly increasing, and numbers at present 5,589. Of these 202 are foreigners.

The Norrlandian Forestry Union was founded in the year 1883. Its original aim and object was to stimulate interest in forestry, particularly in the northern Provinces of Sweden, called Norrland, by organizing meetings and employing planters and instructors in silviculture for the purpose of assisting private forest owners. The union had from the first another aim, namely, to provide the necessary forest seeds of a suitable nature for forest culture in Norrland, and to draw up statistics on forest cultivation and forest fires in that part of the country. In the year 1913 the union was reorganized on a wider basis.

The [governing] committee consists of not less than 7 and not more than 11 members, elected for a term of three years at a time. The union now carries on its activity mainly along the same lines as the Swedish Forestry Society. It organizes annual excursions to various state and private forests in Norrland. These excursions are largely made to the vast estates, owned by the lumber companies in these parts of Sweden. The initiative and policy of the union have exercised a great deal of influence on Norrlandian forest legislation.

The union's periodicals are: Norrlands Skogsvårdsförbunds Tidskrift (The Norrlandian Forestry Union's Journal) and Skogsvännen (The Forest Friend). The former is published quarterly, and contains more or less technical papers on forestry. In the latter, which is also published four times annually, there appear popularly written instructions and advice relating to sundry kinds of measures suitable for forestry. * * *

Among the leading members and patrons of the union are men drawn from the Norrlandian lumber companies who contribute liberally toward the union's work. By way of state grant the union has of late years been in receipt of 5,500 Swedish crowns annually. The union has at its disposal a fund "for awarding prizes to small forest owners."

At present the union has a membership of something like 2,500.

In the course of its life of nearly 50 years, the Norrlandian Forestry Union has had a very great influence on Norrlandian forestry. When the union was founded forestry in the north was characterized by the exploitation of the almost untouched natural forests. Nowadays, forestry in these northern parts of the country is on the whole run on parallel lines with those of southern Sweden. The forestry of northern Sweden, however, presents very special problems, and in spite of the establishment of the Swedish Forestry Society, covering the whole of Sweden, there is good reason for the perpetuation of the Norrlandian Forestry Union.

The Skogssällskapet (Forestry Society) is carrying on its work along lines that materially differ from those along which the two aforesaid societies or unions are working. The Forestry Society was founded in the year 1912, its chief task being the afforestation of such areas as have for a long time been deforested (heaths) or have of late years been the subject of mismanagement.

This society has located its sphere of labors in the southern Provinces of the country, where there are large areas of land on which, thanks to good soil and favorable climatic conditions, afforestation is profitable. The two species most generally used are pine and spruce.

For the purpose of performing its task the society is trying to interest local authorities in establishing communal forests by the purchase of minor areas of forest soil from private persons, and to amalgamate these into forests on behalf of the community—village or borough, as the case may be. The society, which has in its employ persons trained in silviculture, on payment of expenses assists such communities in the care and management and economic exploitation of the communal forests thus established.

The society's supreme management is in the charge of a central council, and its registered offices are at Gothenburg. The central council includes, as *ip* *facto* members, the chairmen of the committees of ea of the communal forests. The remaining members a elected for terms of six years at a time. The centr council appoints a managing director trained forestry. * * *

The society has in the course of its work establishe about 80 communal forests with a total area of 40,0 hectares.

The society's expenses are defrayed to a large exte from the income from bequests and donations, and al from membership fees and the fees paid for the ca and management of forests which are looked after b the society.

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New Zealand's native white pine is reported to b rapidly approaching the point of depletion which wi make necessary the importation of the species int that country. The present large exports of New Zea land white pine are expected to continue, however, f another year or two.

Personals

Ralph C. Hawley, professor of forestry in the Yale School of Forestry, has been appointed Morris K. Jessup professor of silviculture to fill the vacancy left by the death of Prof. J. W. Toumey.

Harold J. Lutz has been appointed assistant professor of forestry in the Yale School of Forestry, effective July 1, 1933. After obtaining the B. S. degree in forestry from Michigan State College in 1924, Professor Lutz spent two years in Alaska with the United States Forest Service. After obtaining the M. F. degree from Yale in 1927, he spent a year in investigative work with the Connecticut Agricultural Experiment Station, and was then appointed associate silviculturist at the Allegheny Forest Experiment Station. In 1929 he became assistant professor of silviculture in the department of forestry of the Pennsylvania State College, which position he holds at present. Since the fall of 1931 he has been on leave of absence to complete his work for the Ph. D. degree at Yale under a fellowship grant from the Charles Lathrop Pack Foundation.

Emanuel Fritz, associate professor of forestry at the University of California, has resigned as editor of the Journal of Forestry. Professor Fritz, who was associate editor of the Journal for eight years and editor-in-chief for three years, stated that the increasing amount of time required by the work had made it necessary for him to relinquish it. No appointment of a successor has so far been made.

L. O. Howard, former chief of the Bureau of Entomology, has returned to Washington after spending a year as official collaborator of the bureau in Paris.

E. N. Munns, in charge of the division of silvics the United States Forest Service, has been elected vic president of the permanent committee, governing bod of the International Union of Forest Research Organi zations. This committee, elected at the meeting of th union in Nancy, France, last September, is composed the following members in addition to Mr. Munns G. Roth, of Hungary, president; L. Fabricius, Germany; Sir Roy Robinson, of Great Britain Y. Ilvessalo, of Finland; H. Badoux, of Switzerland P. Guinier, of France; and A. Pavari, of Italy. Th next annual meeting of the permanent committee wil take place in the autumn of 1933, in Munich.

M. A. Mattoon, supervisor of the Pisgah Nationa Forest, N. C., was chosen this year as the lecturer t speak to students of the forest schools of the East an Middle West on national forest administration. Hi schedule includes the forest schools at the Universit of North Carolina, the University of Minnesota, Iow State College, Purdue University, Michigan Stat College, University of Michigan, Syracuse University University of New Hampshire, Yale University, Cornel University, Pennsylvania State College, and Georgi State College. The lecture tour covers the perio January 24–March 20. In connection with his talk Mr. Mattoon will hold group discussions on workin conditions in the Forest Service.

Myron E. Krueger, associate professor of forestry a the University of California, is spending a year o sabbatic leave at Harvard University, where he i studying economics.

Officers elected by the Southern California Associa- on of Foresters and Fire Wardens for 1933 are W. C. upe, deputy State forester of California, president; ence D. Turner, Los Angeles County Forester, first e president; S. A. Nash-Boulden, supervisor of the nta Barbara National Forest, second vice president; J. Graves, State ranger, secretary; and J. E. Elliott, sup- visor of the San Bernardino National Forest, treasurer.

A. E. Wieslander, of the California Forest Experiment ation, has received recognition of his discovery of a w species of manzanita, as well as of his work in ablishing more definitely the range of that plant in lifornia, through the naming of the species *Arcto- phylos wieslanderi*. The type specimen was col- ted in the Santa Lucia Mountains where *Arctosta- ylos wieslanderi* covers extensive areas.

Elections of officers by the American Association for Advancement of Science at its December meeting lude that of A. F. Woods, director of scientific work the United States Department of Agriculture, as a mber of the executive committee of the association a 4-year term. Henry Norris Russell, astronomer, of inceton University, was elected president for the pres- t year; Burton E. Livingston, biologist, of Johns Hop- ns University, was reelected general secretary; Henry Ward, zoologist, University of Illinois, was elected rmanent secretary; and John L. Wirt, of the Carnegie stitution, Washington, D. C., was reelected treasurer.

John C. Kuhns, for the past eight years supervisor of the Whitman National Forest, Oreg., has been transferred to the Snoqualmie National Forest, Wash., as supervisor. He will succeed W. G. Weigle, who is retiring, and will be succeeded on the Whitman Forest by Walt L. Dutton, who has been inspector of grazing in the regional office of the Forest Service at Portland, Oreg. Mr. Kuhns is a forestry graduate of Penn State College.

W. V. MacNaughton, who for the past three years has been connected with the newsprint division of the International Paper Co., has been appointed assistant research chemist at the pulp and paper laboratory at Savannah, Ga., of which Charles H. Herty is in charge. Mr. MacNaughton is a graduate of McGill University and has had a number of years' experience in paper manufacturing. He succeeds George C. McNaughton, resigned.

Harold S. Foley, of Foley, Fla., and Mrs. Lynwood Jeffreys, of Jacksonville, have been appointed members of the Florida Board of Forestry by the governor of the State.

John M. Heilman has been permanently appointed forester for the city of Newark, N. J. He is stationed on the Newark watershed of 35,000 acres, with headquarters at Charlotteburg, N. J. Mr. Heilman was formerly with the New Jersey Department of Conservation and Development.

Bibliography

"Cary" in an Enlarged Form

By E. E. Carter, United States Forest Service

In every profession, certain books are so well known at they are commonly identified merely by the name the author. Sometimes the title is discarded the re readily because it was intended to emphasize some a or modest limitation which time has shown to be true. So it is with "Cary"[3] among foresters. The ginal title, "A Manual for Northern Woodsmen," plied both geographical and occupational limitations. e former has now been removed, so far as the United tes is concerned. The "woodsman" remains to phasize the thought expressed repeatedly in the t, sometimes subtly, sometimes bluntly, that the ok is not written for students of forestry, but for a cial class of practical forest workers. Doctor Cary ms to believe that there is some gulf between these groups. It is perhaps significant that those who use his book have tacitly discarded his classification as represented by the title. Although the proponent of the distinction between foresters and woodsmen, Doctor Cary is one of the best exponents of its inherent falsity.

Few men in forest work need to be reminded of the contents of the previous editions of the manual. There are too many cover-stained, pencil-marked, dog-eared copies on the desks, in the packs, or in the pockets (rarely in the bookcases) of the doers in forestry to make necessary any extended discussion of the chapters on land surveying, forest maps, log and wood measurement, and timber estimating. They have been and are a very present help in time of trouble. The chapter on log and wood measurement is still the briefest and is not so fully satisfying, but the worker in this particular field now has available other and more comprehensive guides and instructions. These four chapters have been retained with few changes. They reflect the experiences of a man who has done under forest conditions the kind of work described, who knows "the

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ary, Austin: Woodsman's Manual. 4th edition, 366 pp., illus. nbridge, Mass., Harvard University Press, 1932.

tricks of the trade," and who can tell of them plainly and simply.

A new chapter, On Growth of Timber, has been added. The surprising thing about it, and about the discussion of it in the preface, is the apologetic tone with which it is presented—apologetic not for its substance but for its inclusion. Doctor Cary says in effect that the time has come when woodsmen in America have to deal with growth as part of their business, so he has tried to help them in their thinking and in their work in this field. He succeeds in offering something of value to many to whom the subject is not new as well as to the previously ignorant.

This value to the student, in forest school or out, lies in the coldly practical and cautious way in which Doctor Cary selects tested facts and omits unessentials and refinements. He uses the case method, telling briefly but effectively what has been done and tested by time in specific instances; he shows suspicion of everything that has not proven its worth by actual results. For example, he states: "The normal yield table * * * is an ideal or standard, and at that less reliable than might be thought because with the idea of full stocking understood in a general way, different men vary more or less in interpretation." He is didactic on occasion, with the experience of an observant lifetime rather than definite data to support him. "A stand that has the right [yield table] number of trees for admirable stocking at 20 years of age is liable at 50, if unmanaged, to be much too dense to yield best or according to the table. Conversely a stand that in early years appears entirely too open may in the course of time contain just as much timber as normal stands." Such reflections of Doctor Cary's years of practical experience add greatly to the worthwhileness of the book. But sometimes a few added words of explanation would not be amiss, as when he includes that unusual table for second-growth hardwoods in New England, with the indicated number of trees per acre increasing each decade. In this case, little space would have been needed to bring out more sharply the facts that only trees 7 inches in diameter breast high and larger are considered and that the table carries the stand only to age 80.

There is a challenge to American foresters in Doctor Cary's caution and skepticism. Here is a man of unquestionable qualifications as a forestry leader and of wide reading in American forestry literature, undertaking to write about growth for the guidance of the hard-headed forest manager who lacks forest-school training. Partly directly, partly by inference, and especially by omission, he warns his readers that there is little on the subject as yet available for confident application by the forest owner or manager, and that they should be wary of the complexities with which professional foresters are likely to enmesh and baffle the practical man. Is Doctor Cary right, granting that the practical man must have good intelligence in order to be really practical? If so, what needs to done about it?

The new chapter is delighful reading. In it, Doc Cary is philosophical and even epigrammatic. "T relative cost of operating large and small sizes [of tre is a matter that it was easy to drop out of mind, wh the fact that timber does actually grow and impr was apparently beyond the comprehension of man (Doctor Cary obviously does not consider data showi high costs for small timber to represent any startli new discovery.) "Forests have been selectively through all stages of lumbering history." "The b of managers need reminder, guide and check"—a therefore plans are necessary. "Radical reversal policy without adequate grounds for it is of course bad and dangerous thing." And in his summary the subject, "Too elaborate figuring may lead to c fusion." If the new chapter serves no other purp than to remind foresters (who can read it profitab whether they are woodsmen or not) that "sim methods are best," it will take its place with th written in former years to make the whole book cherished possession.

Determination of the Errors of Estima of a Forest Survey

By S. R. Gevorkiantz, United States Forest Service

The ultimate goal of the technic of forest surveys to strike a balance between the expediency and t reliability of the work. The knowledge of the reliab ity of the survey statistics is, therefore, of paramou importance. The authors of this paper [4] explain h to evaluate the various errors of sampling and how coordinate the different items of land-area classificati and of tree volume. The paper lays a foundation up which much constructive thought will gradually devel and in most respects is clear and instructive.

A forest survey is a method of sampling. The p portion of forest types or other land areas is usual determined by one of two methods: (*a*) Number plots in each type in relation to the total number plots; or (*b*) linear distance traversed through each ty in relation to the total length of line run. The law sampling states that, if an event which can happen two different ways is repeated a number of times und the same essential conditions, the ratio (R) of t number of times that it happens in one way to the tot number of trials approaches constancy as the numb of trials is increased indefinitely. The greater t number of observations or trials, the more reliable t sample is ordinarily considered. In a homogeneo iverse the value of R approaches constancy sooner an it does in a heterogeneous universe; therefore in a mogeneous universe fewer trials are necessary.

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[4] Schumacher, Francis X., and Bull, Henry: Determination of Errors of Estimate of a Forest Survey, with Special Reference to Bottomland Hardwood Forest Region. Journal of Agricultural search, December 15, 1932, pp. 741–756.

In forest surveys one deals with a heterogeneous iverse. The authors' analyses essentially prove this int. The heterogeneity of the universe along the rvey lines is overcome by a closer spacing between ots, while the heterogeneity in the opposite direction overcome by a closer spacing between survey lines. With a given spacing between plots, sampling is sentially accomplished by means of survey lines, and ots or linear measurements are used only to determine proportions of the items under consideration. e larger the number of survey lines, the more reliable the proportion of the observed items. The universe thus broken up into rational subgroups, the variabil- of which, whether it conforms to the theoretical ror of random sampling or not, is an evidence of the ality of the whole. The proper analysis of the reliaity of surveys, therefore, requires a study of the riability of survey statistics with both the distance tween the lines and the spacing between the plots. certain desired accuracy should then be decided upon relation to the area of the universe, and the spacing tween lines and plots adjusted accordingly. These sential variabilities, however, have not been concluely analyzed by the authors and, instead, a recomendation has been given to use a spacing between lines 10 miles. This recommendation would seem to quire further analysis.

The method of correlating errors in volume and area a contribution to the literatue of forest surveys, and e paper as a whole may be read profitably by all esters interested in that subject.

A Study of Decay in Douglas Fir

By Ernest E. Hubert, University of Idaho

In reviewing A Study of Decay and Other Losses in ouglas Fir in Western Oregon and Washington, the cent contribution to our knowledge on the pathology our important timber trees by J. S. Boyce,[5] there is uch to be said in commendation of the thoroughness the work and the excellent manner in which it is esented. The bulletin emphasizes the importance of t-finding studies to determine more accurately the rt defects play in the economics of forest management. "Knowledge of prospective yield is of value ly if correlated with knowledge of prospective loss" ight well be used as a basis for readjusting our age-old ncept of the use of yield tables.

The main object of the study was to determine the ount, rate, and types of losses affecting the almost re stands of Douglas fir in Washington and Oregon. e data obtained are intended to establish the proper age of cutting second-growth as well as overmature stands in order to avoid serious losses due to decay and other factors. Following a brief review of the various agencies which cause loss, the methods used in the study are given in detail. In all, measurements were made on 2,633 Douglas firs representing a total volume of 10,146,530 board feet.

The principal loss factor was found to be decay (16.99 per cent). Of the 7 or 8 wood-rotting fungi common on Douglas fir, *Trametes pini* was found to produce the greatest amount of loss, or 13.7 per cent of the total board-foot volume and more than 80 per cent of the total loss due to decay by all species. Brown trunk rot caused by *Fomes laricis* and the red-brown butt rot caused by *Polyporus schweinitzii* came next in importance but represented only 1.46 per cent and 1.06 per cent, respectively.

Nearly 28 per cent of the total volume was found to be lost through all of the factors studied. Of the factors other than decay, Boyce finds that 9.25 per cent of the loss of total volume was due to breakage, a little less than 1 per cent due to shake, and about 0.6 per cent due to miscellaneous defects. No relation was found between the age of the stand and the loss due to miscellaneous causes. As the age of the stand increased the loss through shake increased, but age again seemed to have no effect upon the loss through breakage. This loss, however, was markedly increased on rougher ground, in denser stands, and among the larger trees.

The more important heart rots showed exterior signs of their presence on the trunks of living trees, swollen knots and conks indicating the presence of red ring rot, and fire scars, churn butts, and conks pointing to the presence of red-brown butt rot. It was found that scars play a minor rôle as entrance points of decay from red ring rot, which enters mostly through dead branches.

With some fungi a small amount of decay was found in the heartwood of very young trees, but in general the rapid increase in decay appeared in mature and overmature stands. The data furnish means of determining the rate of decay in mature and overmature stands and so make it possible to evaluate the amount of sound material which may be obtained. In the future the decay problem will present fewer difficulties, since the cutting age for Douglas fir will fall somewhere below 110 years. On Sites I, II, and III very little loss due to decay was found below this age. The use of unmerchantable trees as seed trees, on account of the amount of decay they contain, is indicated as an economic method made possible by this study; trees not worth felling can also be left with greater assurance that no valuable material has been overlooked. The study also renders much easier the task of bucking the trees into logs and selecting the portions to be culled through a better knowledge of the exterior signs denoting decay.

Boyce's work is a valuable contribution to our knowledge of Douglas fir stands and includes many practical

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U. S. Department of Agriculture Technical Bulletin 286, 60 pp., s. 1932.

applications of the carefully analyzed data. This type of study should be applied to all of our important commercial tree species. There was never a greater need for accurate inventories of our forest capital, and the evaluation of losses due to decay, insects, fire, breakage, and other factors has become a necessary part of our forestry practice.

A Self-Liquidating Reforestation Plan

A program for "Reforesting Pennsylvania's Idle Land as a Self-Liquidating Public Work" has been issued by the Department of Forests and Waters of that State as Bulletin 51. It was compiled by the Pennsylvania Forest Research Institute, which is under the direction of E. A. Ziegler.

The immediate need for the utilization of the 4,000,000 acres of idle land in the State is stressed. Proper use of these acres should be made so that they may provide their share of taxes, a crop revenue, and work for the unemployed. Since agriculture is already overdeveloped in Pennsylvania, these lands, which constitute almost one-seventh of the State's area, can best be used for growing trees. The need for forests is indicated by the fact that less than 16 per cent of the lumber used in the State is grown there.

The bulletin suggests that a 10-year planting plan should be initiated, with the State assuming leadership. It advocates the purchase of 25,000 acres of land and the planting of 15,000 acres with forest trees in the next two years, that program to be doubled in each succeeding biennium. At least half of the estimated expenditures of $294,000 by the State and $100,000 by counties and municipalities during the next two years would go directly into emergency labor.

From such a program, requiring an initial investment estimated at $12 per acre and an annual expense of 20 cents per acre, the State may expect to be built up a capital value of $100 to $300 per acre, according to the bulletin.

Cutting Practice for Small Forests

By W. R. Mattoon, United States Forest Service

A bulletin with a timely and important message, which will be widely valuable because of its extensive application and semipopular, readable style, has recently been published by the Yale School of Forestry.[6] Extension foresters and others engaged in interesting forest owners in good cutting pract
and a certain class of woodland owners will find
information given here very useful. The price of
bulletin will probably much restrict its distribu
among farmers.

A brief discussion of clear cutting furnishes the pr
argument for avoiding the method, and this leads u
a description of selection cutting, which is shown to
the rational and profitable method for farmers and ot
owners of small acreages of woodland. A deta
account of the number of trees and the volume be
and after cutting selectively furnishes valuable d
Timber production is treated in terms of saw tim
rather than cordwood.

More emphasis might have been placed on
possibility of the sale of some of the timber cut in
thinning process in addition to its use on the farm
fuel and repair wood. Such sales of timber prov
an important increase to the farm cash income in m
regions.

This publication is an important addition to
sources of basic information on the subject.

Recent Publications of the Forest Serv

(These publications can be obtained from the Superintendent of D
ments, Washington, D. C., at the prices indicated)

Technical Bulletin 323–T, Second Growth Yi
Stand, and Volume Tables for the Western W
Pine Type, by Irvine T. Haig. 10 cents.

Technical Bulletin 332–T, The Bearing Strength
Wood Under Bolts, by George W. Trayer. 5 cen

Technical Bulletin 337–T, The Portable Band Saw
and Selective Logging in the Loblolly Pine For
of North Carolina, by R. D. Garver and J. B. Cu
5 cents.

Circular 236–C, Design Factors Affecting the Stren
and Rigidity of Wooden Crates, by George E. He
5 cents.

Circular 239–C, Moisture Content of Wood in Dw
ings, by Edward C. Peck. 5 cents.

Farmers' Bulletin 1071–F, Making Woodlands Pro
able in the Southern States, by W. R. Matto
(Revised.) 5 cents.

Farmers' Bulletin 1693–F, Growing Christmas H
on the Farm, by Perkins Coville. 5 cents.

Leaflet 30–L, Cutting the Farm Woods "Profitwis
by R. D. Garver. (Reprint.) 5 cents.

Leaflet 35–L, Producing Pine Nursery Stock in
South, by Philip C. Wakeley. (Revised.) 5 cen

Job-Load Analysis and Planning for Executive W
in National Forest Administration, by E.
Loveridge. 25 cents.

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[6] Hawley, Ralph C., and Goodspeed, Allen W.: Selection Cuttings for the Small Forest Owner. Yale University, School of Forestry Bulletin No. 35, 34 pp., illus. 1932. 35 cents.

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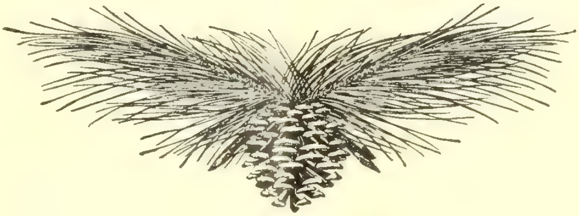

May 1933

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Announcements

Winners of Pack Fellowships

Three Americans and two Canadians were selected by the Charles Lathrop Pack Forest Education Board to receive the fourth annual awards of fellowships. The successful candidates and their projects are:

Walter U. Garstka, instructor in forestry, Pennsylvania State Forest School. To make organic analysis of leaf litter collected from forests growing on podsolized and brown-earth soils immediately after its fall in the autumn.

Harold R. Hay, graduate student, University of Wisconsin. To make a study of changes in the physical properties and chemical constituency of wood subjected to steam treatments.

John Edward Liersch, junior forester, British Columbia Forest Service. To continue a demonstration begun under a 1932 Pack fellowship regarding the practicability of economic selection in the Douglas region.

Nicholas T. Mirov, graduate student, University California. To make a study of transpiration by d ferent forest cover species with reference to precipi tion and moisture content of the soil.

Louis Rene Scheult, graduate student, University Toronto, Toronto, Canada (also holder of a 1932 Pa award). To make a regional study of forest develo ment in relation to the pulp and paper industry in typical forest region.

* * *

The annual meeting of the National Conference State Parks will be held May 25–27 at Bear Mounta Inn in the Palisades Interstate Park on the Huds River, N.Y.

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State Forestry

'isconsin Profits from Relief Program

eduction in forest fire damage in Wisconsin during 2 resulted at least in part from the work done by nployed labor in reducing fire hazards in the forests, Paul D. Kelleter, Director of Conservation of consin. Mr. Kelleter considers that the decrease amage caused by forest fires from $421,501 in 1931 $69,320 in 1932 in Wisconsin forest protection icts is an example of what is meant by "self-liquida-" forest relief work.

f the $500,000 appropriated by the State in 1932 lieve the distress of the unemployed and to develop augment the facilities for forest protection, ,221.08 was expended by the conservation depart-t, $369,691.98, or 85.45 percent, being paid in es to 12,790 men in 35 counties. Most of the men loyed were from cities and towns near the districts hich they worked. Common labor was paid at rate of 25 cents per hour for the first 4 weeks 30 cents per hour thereafter. Foremen, graders, tractor operators were paid 35 to 40 cents per hour. ns and trucks were hired at local prevailing rates. ork accomplished included the building of new roads and firebreaks; fire hazard elimination; truction and improvements; and miscellaneous ects, with funds distributed among the projects as ws:

ie thousand and twenty miles of new fire road were tructed at a total cost of $374,299.17, or 80.62 ent of the total expenditure. In constructing roads, which cost $366.96 per mile, 17,497 rods l, 266 bridges of an average length of 22.7 feet, 764 erts, and 299 gates were installed.

iree hundred and forty-two and two tenths miles irebreaks were constructed at a total cost of 555.40, an average cost per mile of $118.81.

re hazard elimination included cutting of snags, ing of road slash, brushing of telephone line, and osal of slash, at a total cost of $10,669.82.

ghteen thousand six hundred and seventy-nine dol-nd ninety-seven cents was expended on construc- including the building of 21 new fire towers, 12 r replacements, and 8 tower relocations; tower re-; addition, improvements, and repairs to ranger station buildings; construction of 190.9 miles of new telephone line at an average cost of $35.86 per mile; and improvements to old telephone lines. Practically the entire expenditure from the relief funds for these projects was for labor, supplies and materials being charged to other funds wherever possible.

"Miscellaneous" included construction of gates not in other projects; brushing; cruising; tower cabin construction; administration and supervision; and tools, supplies, and transportation not charged to other projects. The expenditure under this classification was $19,916.72.

Director Kelleter states that projects planned by the conservation department for 1933 would provide work for 16,000 to 40,000 men, depending upon the funds made available by the State.

Tennessee Plants a Million Trees in Spring Season

By James O. Hazard, State Forester, Tennessee

One million forest tree seedlings were planted in Tennessee during the spring planting season of 1933, January 15 to the last of March. Among the species planted, black locust, yellow poplar, shortleaf pine, and loblolly pine predominated.

Approximately 800,000 of the seedlings were black locust. This species is favored by Tennessee planters because of its rapid growth on the waste areas which have developed on so many farms in the State. These areas planted to locust very soon supply the farms with fence posts and often provide additional posts for sale. It is not unusual in west Tennessee to find $100 worth of posts per acre in a 10-year-old plantation on land so badly eroded that it was absolutely useless for agricultural purposes.

Shortleaf pine is being planted on eroded, "raw" soil because of its superior capacity to grow on this type of land. Loblolly pine is planted on soils which are ordinarily considered suitable for locust where the farmer prefers a crop of pine. Considerable interest has been manifested in pine in west Tennessee during recent planting seasons. There has also been a demand in recent years for yellow poplar seedlings. Many farmers who remember the large yellow poplars of earlier days in this region are anxious to bring back, or start to bring back, the poplar timber.

Approximately 500,000 acres of badly eroded farm lands in west Tennessee are in need of planting. The area of 1,000 acres planted this year is small in comparison, but still constitutes a substantial beginning.

Blister Rust Control Work Helps the Unemployed in Maine

In spite of unfavorable economic conditions, including the slump in white pine values, blister rust control work in Maine increased during 1932, according to W. O. Frost, blister rust agent. Work was conducted in 56 towns and cities in 13 counties, and 34 of the towns appropriated cooperative funds. The eradication season began May 9 and ended September 10, with 8 experienced temporary men employed for advance scouting and the supervision of eradication crews. Each blister rust agent supervised 2 to 6 eradication crews during the season, a crew consisting of 4 to 6 men.

Blister rust control helped solve the unemployment problem in 9 cities and towns, 66 men being employed approximately 14,000 hours at a cost of $4,045.24. The scale of wages averaged about 30 cents an hour, some towns making cash payments while others paid only a portion in cash and the remainder in credits for groceries, fuel, etc. The towns financed the work and upon its completion were reimbursed by the State in the amount of 50 percent of the total expenditures. The men, after a few days' training by the agents and under the supervision of trained foremen, did satisfactory work.

The total cost of the control work, which covered 79,701 acres, was $16,626.56, expended by all cooperating parties (the Federal Government, the State, towns, and private owners). The cost per acre was 21 cents. Ribes plants eradicated totaled 905,810 wild and 4,726 cultivated, an average of 11 plants per acre.

◆

President Roosevelt has ordered from the New York State Conservation Department 5,000 tulip-poplar seedlings and 1,000 balsam transplants for planting on his estate at Hyde Park, Dutchess County, N.Y. This year is the first time the department has been able to produce satisfactory tulip-poplar seedlings and the President was given the first opportunity to purchase some of them.

◆

During the past 10 years 10,000 redwoods have been planted on the island of Hawaii in the Territory of Hawaii. The territorial forestry department reports that the average survival of these trees is 97.9 percent.

The Yield Tax and the 1933 Legislatu

By Louis S. Murphy, United States Forest Service

Bills embodying recommendations of the Natio Lumber Manufacturers Association that the appli tion of the yield tax be broadened to include mat timber being held for exploitation were introduced the legislatures of Idaho, Oregon, and Washingtor the 1933 sessions. None was enacted.

In Oregon, opposition, it is reported, came chi from holders of small bodies of timber which would entirely cut out during the 10-year transition per provided in the bill for a gradual change from property tax to the yield tax. On such holders tax burden promised to be definitely increased inst of decreased.

In Washington, the proposal, in the form of a ferred property tax, struck a constitutional snag, nec sitating an amendment to the constitution as a p liminary. If such an amendment is adopted at next session of the legislature, 2 years hence, the w will be cleared for the enactment of the proposed l

In Idaho, the bill first introduced was withdrawn revision, and the revised bill failed to be acted u when subsequently introduced.

While this was going on in the Northwest, Maine the Northeast, repealed a yield tax law because its adverse effect on local revenues. The law originally enacted in 1921 and completely revised strengthened in 1929. Forest owners made little of it, however, until recently, perhaps regarding it, the words of its author, as an "umbrella law—so thing to get under when property taxes came down hard." However, when they tried to use it in t manner, as many have done since the depression in, the umbrella blew inside out, so to speak. towns, whose revenues were thereby seriously affect insisted on its repeal.

At this writing some of the State legislatures still in session, at least one of which, that of Flori will probably have an opportunity to vote on the yi tax.

◆

An additional 95,000 acres in 10 Oregon counties recently been classified for reforestation by the St Board of Forestry, increasing the total area so classi to 725,000 acres.

◆

Alabama's 13 State forests range in size from 5 5,480 acres. Only 2, however, exceed 40 acres extent. The total acreage is 8,910.

Experiments with Scotch Pine Transplants in New York

An experiment conducted by the Division of Lands nd Forests of New York State shows that root pruning 4-year Scotch pine transplants does not pay. In an fort to determine whether it is better to double up e roots of this large-sized stock in the planting hole to prune them back moderately, the roots of parts several lots of transplants of this size were lightly uned before planting in the experimental tract on ontgomery County Reforestation Area No. 1. The uned and unpruned pines were planted in alternate ocks of about 100 trees each. The average survival rcentages were: Pruned, 52; unpruned, 67.

That 3-year transplants of Scotch pine are as large ock as can be handled to advantage was shown by other experimental planting of 3- and 4-year-old nes on the Poke-O-Moonshine area. The two lots re lifted at the Saratoga nursery on the same day, ipped together, and planted on adjoining areas by e same crew. One lot was of large 4-year trans- ants, the other of 3-year seedlings. The planting is done late in the season (May 13–14) and was fol- ved by dry weather; under more favorable conditions e difference in survival percentages might not have en so great. Of the 3-year stock, 776 out of 898, or .4 percent survived; only 33.7 percent of the 4-year nsplants, or 288 out of 853, survived.

* * *

A study of areas of Mississippi woodland from which e has been excluded for 5 to 50 years has been under- ken by the Mississippi Forest Service, advises State rester Fred Merrill. Although such areas are rare the State, several small unburned tracts have been nd, and landowners and others are urged to report y additional areas of which they have knowledge. e studies will be made to ascertain the results that y be expected from fire prevention.

* * *

According to figures recently compiled by the New rk State Conservation Department, at the end of 32 there were growing in the 6 State-owned nurseries less than 146,465,000 trees. Of these, 750,000 re 4-year transplants, 23,805,000 were 3-year trans- nts, 42,546,000 were 2-year seedlings, and 79,364,000 re 1-year seedlings. Last year the State used ,000,000 trees on reforestation areas and distributed all a little more than 40,000,000 trees. About half the trees planted on reforestation areas were 3-year nsplants and the other half 2-year seedlings. As e nursery stock increases it is planned to set out a ger number of 3-year transplants, since the longer riod of growth in the nursery means a higher per- ntage of survival.

Southern Pine Beetle Found in Pennsylvania

Infestations of the southern pine beetle (*Dendroctonus frontalis*) have been found in two State forest districts in Pennsylvania. Although there are records of this insect having been present in the southern part of the State, severe attacks have heretofore been practically unknown.

At Mont Alto the beetles were found working on a stand of pitch and shortleaf pines which had made rather slow growth for 3 years. In the Buchanan State forest district the insects appear to have followed a 1930 fire. On Martins Hill, Bedford County, the beetles had attacked pitch and Virginia scrub pines; trees containing larvae were observed at the foot of the mountain and up to an elevation of 2,900 feet.

Minnesota Still Has Some Virgin Pine

A 180-acre stand of 200-year-old virgin white and Norway pine in the Pine Island State Forest, Minn., and on adjoining private lands, was recently examined by L. B. Ritter, blister rust agent. The stand was estimated to contain 6,000,000 board feet of timber with less than 5 percent of cull. Diameters of the white pine measured up to 40 inches with an average height of 110 feet. Excellent white pine reproduction has come in abundantly during the past 20 years.

* * *

Fires burned 80 percent of the forest land in some south Georgia counties in 1932, reports the Georgia Division of Forestry. The extreme drought of the 1932 season aggravated the fire hazard and was responsible for the unusual losses. The damage caused by the 23,560 fires that burned over 6,691,186 acres is estimated at $7,302,960. Fires on forests belonging to timber protective organizations were held to 12 percent of the total area while on unorganized lands the area burned was 30 percent of the whole.

* * *

Salt Lake City, Utah, has ordered more than 10,000 trees for planting on the watershed furnishing the city's water supply. The species being planted include piñon pine, Rocky Mountain juniper, Douglas blue spruce, ponderosa pine, and lodgepole pine.

* * *

H. B. Peirson, State entomologist of Maine, reports that a large area of balsam fir has been killed in that State by an aphid (*Dreyfusia picea* Ratz.) and that the insect is increasing at an alarming rate.

Forestry Activities in the Hawaiian Islands

Ridding Hawaiian forests of destructive wild animals is one of the principal activities of the territorial board of agriculture and forestry, according to C. S. Judd, territorial forester. Assisted by the National Park Service and private ranchers, forest officers succeeded in eliminating 17,637 goats, pigs, sheep, cattle, asses, deer, and horses in 1932.

In building a pig hunters' cabin at the summit of the Koolau Range on the island of Oahu, the board was assisted by the United States Army Air Corps in delivering the material to the site. Three bundles containing redwood timbers, tin wall material, and corrugated iron roofing, weighing 400 pounds each, were dropped from a height of 30 feet by Army airplane bombers within 200 feet of the spot designated. The contents of only one bundle were damaged by the drop. The cabin, 10 by 10 feet in size, was completed in December 1932.

A garden of Hawaiian trees and shrubs was started in 1932 at Waahila near Honolulu by the board of agriculture and forestry in cooperation with the University of Hawaii. Eleven species of native trees and shrubs have already been planted.

Nearly one fourth of the land area of the five main islands of the Hawaiian group, or 1,027,299 acres, is now included in the 64 territorial forest reserves devoted to forest protection. Four nurseries distributed 907,280 trees and plants in 1932, 55 percent of which were planted by farmers, 5 percent by other individuals, and 40 percent by the board in the forest reserves.

* * *

Virginia reports a bad fire year in 1932, with a total of 1,735 fires, but the record of area burned in organized territory has been bettered in only two other years. In 1932, 0.88 percent of the total protected area burned; the two records that surpassed this were made in 1929, with 0.55 percent, and in 1927, with 0.34 percent. The average area burned per fire in 1932 was 49.7 acres, the lowest recorded.

* * *

The cork oak of southern Europe and northern Africa, whose bark supplies the cork of commerce, will thrive in various parts of Alabama, announces the Alabama State Commission of Forestry. Investigations made by the commission indicate the possibility that the production of cork may prove to be a source of revenue to Alabama landowners.

* * *

By proclamation of Gov. Herbert H. Lehman, the week of April 8 was conservation week in New York State.

White Pine Plantation in Vermon Shows Good Growth

While inspecting a white pine plantation at Ches Vt., F. H. Rose, blister rust agent, made a stud determine how fast the trees were growing. plantation was established 20 years ago with the t spaced 6 by 6 feet. Data were taken on a ⅛-acre containing 116 living and 25 dead trees.

The tallest tree was 44 feet high, the average he being 30 feet; the greatest diameter was 9 inches, the average 5 inches. There were 90 dominant tr 25 intermediate trees, and 1 living suppressed t The average height growth per year was 17 inches, greatest growth in height in any year being 42 inc

Ninety-four of the trees were straight and formed; 76 of these were dominant and suitable final crop trees. The remaining 22 had been inju some by weevil, and were poorly formed. Six v infected with blister rust.

* * *

The Virginia Forest Service last year conducted forest fire law violation cases, 45 of which resulte convictions. Fines and court costs aggregating $65 were imposed, and two men were given jail senten of 6 months each. Forest-fire suppression costs the amount of $1,551.37 were collected during the y from persons responsible for fires.

* * *

A new steel lookout tower 45 feet high was structed last year by the New Hampshire St Forestry Department on one of the Milan Hills. T tower will give increased protection to the woodla of the Androscoggin and Upper Ammonoosuc Vall The site was made available through the coopera of the Brown Co.

* * *

New Jersey will use more than 666,000 seedlings spring for planting in fire-damaged and poorly stoc stands in the State forests of the coastal plain reg of south Jersey. The principal species to be plan are loblolly, shortleaf, and pitch pines. Orders more than 2,500,000 seedlings from the State nurse to be planted throughout the State have been recei this spring, according to the division of forests parks.

* * *

A recent Utah law designates blue spruce the offi tree of that State. The measure was sponsored by Utah State Federation of Women's Clubs.

Education and Extension

Cold Damages Windbreak Trees in Central and Northern California

By WOODBRIDGE METCALF, Extension Forester, California

For a number of years California ranchers have pended on exotic trees to protect their crops, animals, d buildings against heavy winds and the summer sun. ecies of the genus *Eucalyptus* have been the most pular and widely used, but other trees from semi- opical countries have also been grown for shade and r ornamentation of home grounds. As periods of ld weather have been of rather infrequent occurrence this region during the past 30 years, these exotics me to occupy a more and more important place in e vegetation of the Sacramento and San Joaquin lleys. Several of them made rapid and vigorous owth, reached large size, and were everywhere in idence in the valley landscape.

During the second week of December 1932, there curred what the Weather Bureau describes as a low-in" freeze which came with a northeast wind of to 30 miles an hour velocity, lasted for 15 to 36 urs, and brought the lowest temperatures since 84 to these valleys. The thermometer dropped to ° F. at Chico, to between 12° and 15° at other ints in Glenn, Yuba, Yolo, and Sacramento Counties, d to 15° and 18° in other widely separated places as r south as Fresno and to points along the coast mewhat south of San Francisco Bay. Besides the usually low temperatures, the very low humidity at accompanied them was extremely damaging to getation. Mr. Leslie Gray, of the United States eather Bureau, informs me that there are records of e occurrence of four periods of somewhat similar ture, though those in the nineties and between 1905 d 1907 did not bring quite as low temperatures as ose in 1884 and 1932. An additional reason for the avy damage this year was the unseasonably warm ather of the fall, which persisted until about a week fore the freeze.

From 10 to 15 varieties of *Eucalyptus* have been used this region, and all of them were more or less badly maged by the freeze. It seems that the physiological ndition of individual trees has much to do with their ility to withstand the cold, for here and there, in ndbreaks and groves in which most of the trees were lled to the ground, trees are to be seen which have tained a fair proportion of their crowns in good condi- n. Most of the semitropical exotics lost all of their aves, and many of them were killed at least to the ound. In the places where minimum temperatures 11° to 15° were experienced, it is doubtful if any ees will recover by sprouting from the ground line, the bark has split and separated from the wood in many cases. On April 1, 1933, some of the trees showed a few green shoots along the lower trunk, but it was too early to tell how many of them would put forth sprouts.

The species which show severest damage to foliage and were probably killed down to the ground are: Blue gum (*Eucalyptus globulus*); red gum (*E. rostrata*); desert gum (*E. rudis*); yellow jacket (*E. punctata*); Australian silk-oak (*Grevillea robusta*); pepper tree (*Schinus molle*); bottle tree (*Sterculia diversifolia*); Canary Island pine (*Pinus canariensis*); Australian beefwood (*Casuarina equisetifolia*); desert athel (*Tamarix articulata*); Canary Island palm (*Phoenix canariensis*); acacias (*Acacia melanoxylon* and *A. baileyana*); gray gum (*Eucalyptus tereticornis*); swamp mahogany (*E. robusta*); and Australian beech (*E. polyanthemos*).

The varieties of *Eucalyptus* listed above are generally considered to be rather hardy. Of the less hardy varieties, many more were killed. The manna gum (*E. viminalis*), although severely defoliated in some localities, seems to have resisted the cold weather better than any other ecualypt. Even these are probably killed to the ground along with all of the other *Eucalyptus* species in the 25-year-old plantations at the Chico Forestry Station. Another tree which in many places has been able to persist with a fair proportion of its crown intact is the *Acacia decurrens dealbata*. In some places, well-established trees of *Tamarix articulata* persisted, though they show severe damage.

Even native vegetation was not entirely unscathed, as coast live oak, toyon, and madrone showed considerable browning of the leaves. Many of the groves and windbreaks are now being cut for fuel, and it is certain that as a result of the December freeze wide areas of the valley country will present an appearance quite different from that of the last 20 years.

* * *

The number of students taking the complete forestry course at the University of California has doubled in the last 3 years. In the spring of 1930 there were 80 students; this term there are 160. In addition, the school gives forestry instruction to a considerable number of students from other departments of the university. Because of the junior college system in California whereby students can take the first two years at an institution near home, the junior and senior classes at Berkeley are larger than the freshman and sophomore groups. There are 36 in this year's senior class. Graduate students number 37 and come from all sections of the United States, with a few from foreign countries.

Ashe Herbarium Acquired by North Carolina University

Through the generosity of George Watts Hill, of Durham, N.C., the herbarium of William W. Ashe, forester and systematic botanist who died in March 1932, has been acquired by the University of North Carolina, of which Mr. Ashe was a graduate. Most of the collection is unmounted, but Mr. Hill's gift makes possible the assembling and mounting of the specimens by T. G. Harbison, an experienced collector and a coworker of Mr. Ashe. It is expected that the herbarium will be ready for use this summer.

The university has also received, from Mrs. W. W. Ashe, a large number of reprints of Mr. Ashe's papers on botanical and forestry subjects. In his scientific writings Mr. Ashe published 510 new botanical names (including species, varieties, and forms).

Mr. Ashe was connected with Government forest work from 1899, and at the time of his death was inspector in the eastern Forest Service region.

Planted Snow Fences in Minnesota

Finding the use of portable snow fences along its rights of way in Minnesota expensive, the Great Northern Railway Co. began several years ago to plant trees to act as permanent snow catches. Now conifers, willows, and caragana are grown for this purpose in nursery gardens managed by the section foremen of the company, who also plant and care for the trees. Parker Anderson, extension forester of Minnesota, cooperated with the railway in working out plans for the production of stock and the planting and maintenance of the trees. In addition to the excellent results obtained from these permanent fences in the way of protection from drifts, the rows of trees add to the attractiveness of the Great Northern's route through the State.

* * *

A number of traveling fellowships for study in Scandinavian countries, carrying $1,000 each, are being offered by the American-Scandinavian Foundation to students of American birth. Graduate students, instructors, and younger professors are eligible. Further information may be obtained from Neilson Abeel, secretary of the foundation, 25 West Forty-fifth Street, New York City.

* * *

Prizes of $50, $30, and $20 were awarded to winners in the annual Charles Lathrop Pack essay and declamation contest held March 1 at the New York State College of Forestry, Syracuse, N.Y. Harry Dengler, class of 1934, won the first prize with an essay on The Necessity for Public Interest in Forests. This Business of Forestry, by Esmond W. Sears, '33, won the second prize, and third honors went to William S. Beckley, '36, whose subject was Forestry and Ur ployment.

New York 4-H Clubs Keep up Plant Record

No lessening of the activities of the 4-H club planters of New York has taken place this year, rep J. E. Davis, assistant extension forester of the I York State College of Agriculture, who assembled tree orders for this spring's planting season. Davis states that orders have been received from 1, farm boys and girls, the enrollment in 4-H fore clubs falling only 24 behind last year's record.

Four counties have over one hundred 4-H tree pla ers enrolled for 1933. Allegany leads with 187; W ming has 134; Oneida 113; and Chautauqua Erie County is a close fifth with 94 forestry members.

The State Conservation Department gives 1, trees free to each new 4-H forestry club member 4-H foresters will plant 1,355,000 trees in 1933. T year's tree planting season will mark the eighth of 4-H forestry club work in New York State, and planting by club members of more than 6,500,000 t on New York's idle acres since the project was star in 1926.

Through the medium of the 4-H clubs the prac of reforestation and a better knowledge of farm estry have reached over 6,000 New York farms. Tr for 4-H plantations are generally selected with one more of three purposes in view: Production of tim for home use; fence posts for home use and for s and Christmas trees for sale. For these purpo Norway pine, European larch, black locust, Norway spruce have been in greatest demand.

Tree Distribution in Puerto Rico

During the calendar year 1932 the number of tr distributed from the three nurseries of the Pue Rico insular forest service was 1,826,072, according a report of Charles Z. Bates, extension forester of Pue Rico. These trees were planted by private individu agricultural agents, Government departments, corp ations, public institutions, and 4-H clubs; 14,769 them were planted on the insular forests, 3,079 the Luquillo National Forest, and 13,050 were ship out of the island. Stock distributed to farmers un the terms of section 4 of the Clarke-McNary law rep sents 86 percent of the total number.

Species grown in the insular nurseries incl Casuarina, Spanish cedar, raintree, mahogany, eu lyptus, and other native trees. In spite of the hu cane of September 1932 which created widespre devastation in the island, the general depression, a the low price of sugar, Mr. Bates reports that demand for trees for farm planting this year grea exceeds the capacity of the nurseries.

ornell Foresters Spend Spring Vacation in Southern Camp

For the sixth consecutive year, a group of Cornell estry students (seniors and graduates) spent the ing recess, which this year occurred between March and April 12, at Witherbee, S.C., headquarters of North State Lumber Co. Their camp was located miles up the Cooper River from Charleston, where y occupied a building erected by the company for the of foresters. Camp equipment was furnished by U.S. Army post at Fort Moultrie, S.C. Twenty dents registered for the trip and were accompanied Prof. A. B. Recknagel, who also led the previous peditions.

The holdings of the Cooper River Co., a timber osoting plant in Charleston, and the experimental ntings of the Clemson Agricultural Station at mmerville were visited by the students. In 1928 Cornell group established permanent sample plots serve as a check on the measurement of growth and roduction of southern pine forests. These plots re remeasured and records made of the 5 years' wth.

enefits of Windbreaks Demonstrated in Minnesota

On the open Minnesota prairie the cold January nd was blowing at a rate of 27 miles an hour, accord- to the extension forester's anemometer. In the lter of a windbreak on a near-by farm a few minutes er the same gauge registered only 3½ miles an hour. is practical demonstration of the protective possi- ties of a well-placed and properly planted wind- ak was given by Parker Anderson, extension forester Minnesota, in the prairie region of western Minne- a.

In 1920 a cooperative windbreak project was started the division of forestry of the University of Minne- a and the State Forest Service. At that time there s little interest in tree planting in the State, due gely to the many failures of early attempts to estab- trees, particularly in the prairie region where wind- aks were most needed. From 1920 to 1926, about demonstration windbreaks were established, most of ich were successful. The work was taken over by the ension division in 1926, and a new type of shelter- t planting was developed, which has become known the Minnesota standard windbreak plan. This speci- a definite combination and arrangement of trees. ch rapidly growing species as poplar and willow form outer rows, with conifers on the inside, and valuable dwoods (and in southern Minnesota nut trees) be- een. The planting is so planned that not only pro- tion against the prevailing north and west winds but fuel wood, posts, lumber, and other wood products for farm use are eventually provided.

So satisfactory has this plan proved that commercial nurseries in Minnesota have adopted it and regularly carry planting stock of the necessary sizes and species. The growing appreciation of Minnesota farmers of the value of such windbreak plantings is shown by the fact that more than 60,000 trees a year were planted by them from 1926 to 1929, inclusive, the number increasing in 1930 to 90,000 and in 1931 to 170,000.

Plans for a New Arboretum

Formation of an arboretum comparable with the best in the United States is projected by the Arthur H. Scott Horticultural Foundation, according to the report of its director, John C. Wister. The expressed purpose of the foundation, which is connected with Swarthmore College, Pa., is "to help horticulture by visual demonstration which can be best realized by the planting in a public place of such trees, shrubs, and flowers as can be used by people of average means living in the Philadelphia district." The Scott Aboretum will occupy about 175 acres in Crum Creek Valley. Part of this land contains virgin timber and part is uncultivated river silt. Plans call for a division of the aboretum into four sections which will contain: Plants, shrubs, and trees native to Delaware County, Pa.; trees native to Pennsylvania but not native to Delaware County; plants and trees native to North America; and trees which grow in the same climate in other parts of the world.

* * *

A forest of more than 3,000 acres and securities valued at about $200,000 have been bequeathed to the University of Virginia under the will of Dr. Walter M. Seward, of Brunswick County, Va. The land is to be used by the university for "practical demonstrations in the art of forestry" and the money "toward the maintenance and upbuilding of the school of forestry."

* * *

Seventeen forestry students from the University of Michigan spent a week on the Pisgah National Forest, April 14–21, under the leadership of Prof. L. J. Young. The trip, which has become an annual event for Michigan foresters, included visits to logging operations, recreation developments, research projects, and other national forest activities.

* * *

A course in aerial photography is being offered during the present semester at Harvard University. The latest photographic equipment, including a 5-lens camera, is being used.

Forest Service Notes

Copeland Report Outlines a National Program for Land Utilization

A land use program affecting more than a third of the entire land area of the United States is presented in the report prepared by the Forest Service in response to Senate Resolution 175 of the last session of Congress, introduced by Senator R. S. Copeland, of New York. The report presents a coordinated plan intended to insure all of the economic and social benefits which can and should be derived from productive forests by fully utilizing the forest land and by making all of its timber and other products and its watershed, recreational, and other services available to meet national requirements.

Main findings may be summarized as follows:

1. Practically all of the major problems of American forestry center in, or have grown out of, private ownership.
2. One of the major problems of public ownership is that of unmanaged public lands.
3. There has been a serious lack of balance in constructive efforts to solve the forest problem as between private and public ownership and between relatively poor and relatively good land.
4. The forest problem is one of our major national problems.

The report concludes that the only assured means to anything approaching a satisfactory solution of the forest problem are, first, a large extension of public ownership of forest lands, and, second, more intensive management on all publicly owned lands. It is therefore recommended that public agencies should acquire 224,000,000 acres of forest land, including a part of the abandoned agricultural land now available, and place it under forest management at the earliest possible date following acquisition. A considerable part of this land has or will come into public ownership in any event by reason of tax delinquency, according to the report. The States and their local subdivisions should take over as much of this acquisition program as their resources permit. The Federal Government should assume only that part which the States cannot carry.

Other recommendations include the placing of an additional area of 191,000,000 acres under fire protection and raising the standards of protection on much of the 321,000,000 acres now under protection; planting at least 25,000,000 acres during the next 20 years; raising the area under intensive forest management during the next few decades to at least 70,000,000 acres and preferably to 100,000,000 acres, and the area under extensive management to at least 279,000,000 and preferably to 339,000,000 acres.

In his letter transmitting the report to the Sen
Secretary Henry A. Wallace says in part:

> The solution [of the forest problem] is the only me
> to stable, permanent forest industries, with a pre
> pression value including forests of $10,000,000,000
> gross products prior to 1929 of nearly $2,000,000,
> This is also true of industries using forest resou
> other than timber and of a large group of other inc
> tries dependent on both.
>
> The solution will provide an important source of
> ployment for labor at a time when the developmen
> labor-saving machinery makes employment a crit
> national problem. Our forest land in productive c
> dition and the dependent primary forest indust
> alone would furnish employment for 2,000,000 men
>
> The solution offers an important aid in public fina
> by increasing the amount of taxable property. * *
> [Pulp and paper mills, for example, depend on prod
> tive forests for their existence.]
>
> It offers one important means for maintaining a
> anced rural economic and social structure in the pa
> of the country which will grow timber, by utilizing
> of the land productively for the purposes for whicl
> is best suited, maintaining industries in perpetuity,
> holding a reasonable part of the population in the co
> try in a healthy, diversified rural life.
>
> Programs for the various activities which make
> forestry, such as protection against fire, insects,
> disease; extensive and intensive forest practice;
> vision for watershed protection, recreation, forest
> life, and for the management and utilization of for
> ranges have been worked out in as much detail
> present information permits and incorporated in the
> tional plan which forms an important part of the rep
> on the Senate resolution. The Department endor
> the recommendations for these programs.

Ninety percent of the total area of devastated
poorly stocked forest land and 95 percent of
current devastation is on privately owned forest lan
the report states. Forest deterioration, which is
more extensive and hence more serious than devas
tion, results from cutting without regard for fut
productivity of the forest, or from forest fires, or fr
the two combined. More than 99 percent of s
cutting and 98 percent of the area burned annua
is on private lands.

The public policy of passing excessive areas
forest land to private ownership and the priv
cut-out-and-get-out policy have wrecked or seriou
reduced the productivity of the land, made it diffic
or impossible to pay taxes, and hence have led to
reversion so large in several forest regions as to con
tute virtually a breakdown of private ownersh
Stability of tenure is one of the essentials for tim
growing.

◆

Classing the airplane with the automobile as a
turber of the wilderness conditions to preserve wh
primitive areas have been set aside in the natio

ests, the Forest Service has prohibited the landing aircraft in these regions. In recreation areas and er parts of the forests where automobiles are nitted airplanes are not to be excluded, and landing ds may be constructed.

ewest Portable Radiophone Weighs Only 14 Pounds

By F. V. Horton, United States Forest Service

combined receiver-transmitter portable radio- ne which weighs, complete with batteries, antenna, l all accessories, approximately 14 pounds has been veloped in the North Pacific region of the Forest vice. Tests have recently been completed on the v sets and bids procured for their construction. ey will be used by firemen and smoke chasers in ional forests of the West during the coming fire son, particularly in regions 6 and 1.

he new small radio has a consistent sending range bout 15 miles by voice and a somewhat greater dis- ce by code. It very nearly duplicates the perform- e of the 56-pound, 2-watt, semiportable radiophone o developed in region 6.

third recent radio development in the region is a vier set for semipermanent installation where alter- ing current is available either from regular power plies or through the use of an independent generator ven by a gasoline engine. The maximum range of s set has not yet been determined, but it has been cessfully used over distances of several hundred miles.

National Forest Changes

ransfer of the Kaibab National Forest, Ariz., m Forest Service region 4 to region 3, became ective April 1, 1933. No change was made in sonnel or headquarters.

eorganization of four national forests in western shington has been approved by the Forester. It l involve the Mount Baker, Snoqualmie, Rainier, l Columbia National Forests and will result in the nination of the Rainier, whose lands will be divided ong the others. By Executive order of April 6, Santiam and Cascade Forests in Oregon will be rged under the name Willamette, with headquarters Eugene, Oreg., the order to take effect July 1, 1933.

new national forest was proclaimed by the Presi- t on March 2, 1933. This is the Nicolet Forest in sconsin. It is at present in three units.

n area of 106,000 acres was added to the Wasatch tional Forest, Utah, by Presidential proclamation January 31, 1933. The addition contains about ,000,000 board feet of lodgepole pine, spruce, and and includes the watersheds of three rivers.

ands in Utah known as the Green River area were ded by Presidential proclamation to the Ashley National Forest on February 18, 1933. The new unit comprises a gross area of approximately 42,000 acres adjacent to the forest.

About 129,000 acres were added to the Gunnison National Forest, Colo., through an act of Congress approved by the President March 4. Approximately 150,000,000 board feet of merchantable timber is growing on the area. Another act approved March 4 added 640 acres to the Modoc National Forest, Calif.

Title to 7,431 acres of cut-over land within the St. Joe National Forest has been transferred to the United States through an exchange with the owners of the land, Potlatch Forests, Inc., for Government stumpage.

An Executive order of February 1, 1933, set aside an area of about 55,000 acres in Millard County, Utah, to be used by the Intermountain Forest and Range Experiment Station as a desert range experiment station. Nearly all the major vegetative types found in the desert area of western Utah and eastern Nevada are represented, and studies will be made to develop methods of grazing management best suited to this arid region.

Primitive and Natural Areas Recently Set Aside in National Forests

A tract of 62,600 acres in the Holy Cross National Forest, Colo., has been designated as the Maroon-Snowmass Primitive Area. It lies along the rugged Elk Mountain range which includes a number of peaks of approximately 14,000 feet elevation. About half of the area is above timber line. Maroon Peak, 14,126 feet above sea level, is the highest point. Snowmass Lake in this region is one of the most beautiful Alpine lakes in the United States.

In the Flathead National Forest, Mont., a 625,000-acre tract of wild country constitutes the recently established South Fork Primitive Area. Forty-five miles long and with an average width of 20 miles, the area is one of the largest so far designated in this category. It is bounded on the east by the Continental Divide and on the west by the Swan Mountains, and includes the headwaters of the South Fork of the Flathead River. Trails traverse the region, but there are and will be no roads. There is an abundance of game, including elk, deer, and bear, and the streams offer notable attractions to the fisherman.

An area of 277 acres in the Allegheny National Forest, Pa., has been designated the Heart's Content-Wilkins Farm Natural Area. The Heart's Content tract includes 20 acres of virgin white pine and hemlock, donated by the Wheeler & Dusenbury Lumber Co., and 101 acres surrounding it, also largely of virgin timber, purchased by the Government. In presenting the 20 acres, which includes Heart's Content Spring, an attraction to visitors for generations, the company was actuated by a desire to preserve, for the inspiration and enjoyment of the public, the best remaining example of the once famous Pennsylvania white pine and hemlock forest. These lands will be used as a laboratory for the study of virgin forest conditions. The Wilkins Farm portion of the natural area is a tract of 156 acres adjoining Heart's Content on the west and north, chiefly open and cut over, purchased and donated to the Government by the Pennsylvania State Federation of Women's Clubs to prevent possible commercial development of an objectionable character and to provide for public use and recreation not desirable within the virgin area.

Defect in Ponderosa Pine Logs

By QUINCY RANDLES, United States Forest Service

A study of 47,800,950 board feet of timber scaled in a logging operation on the Sitgreaves National Forest in Arizona showed 4,834,180 board feet of defect, an average defect percentage of 10.11. Timber from parts of 37 sections in 5 townships was included in the study, considerable variation being found as between sections. Defect percentages varied between 5.31 and 16.54.

Logging operations in Arizona are confined almost entirely to virgin stands of pure ponderosa pine. These stands are in small, even-aged groups. The cut comes from the overmature and mature classes for the most part, but the stand is put in good silvicultural condition by the additional removal of the diseased, defective individuals of younger merchantable-sized trees. The timber removed in logging virgin stands carries considerable defect, due to rot and, to a less extent, to losses of merchantable volume from lightning wounds, fire scars, and deformities. Logs and portions of trees that under the terms of the sale agreement are not merchantable on account of defects are left in the woods. An otherwise merchantable log containing 50 percent or less rot is classed as merchantable and the proper deduction made in the scale.

New Planting Tool Developed by Gemmer

A planting tool that can be easily transported and used by one man has been developed by E. W. Gemmer of the Southern Forest Experiment Station. It has a tapered blade 10 inches long, 2 to 3 inches wide, and three fourths inch thick, with a stock 5 inches long having a pistol grip. It weighs slightly more than 5 pounds. The sharpened point is of tempered steel. The weight of the tool and the shape of the blade enable the user to make clean holes in the ground 10 to 12 inches deep and to close them easily.

Originally designed to meet conditions in the South, the tool should prove equally successful for the 1-man crew in planting operations in any part of the country. During January 1933 in the Choctawhatchee National Forest, Fla., more than a thousand seedlings were successfully planted with it under a variety of conditi The rate of planting was close to 500 trees per ma an 8-hour day; the maximum number planted b 2-man crew with a large planting bar was 750.

Peat Mats for Germination Tests of Forest Tree Seeds

By PHILIP C. WAKELEY, United States Forest Service

A form of peat variously known as "peat mo "acid peat," and "florists' peat" gives promise a medium for testing the germination of seeds of vari forest trees. At the Southern Forest Experim Station, the peat, compressed into mats or blocks w grooves on the upper surface to receive the seeds, proved a valuable supplement to, and a possible s stitute for, the cumbersome sand flats ordinarily u for germination tests of the seeds of southern pi In the tests so far made, the peat mats have given m prompt results than the sand flats and, usually, hig final germination.

The mats occupy only one fifth or one sixth of laboratory space required by sand flats, and their does not involve introducing grit or sand am laboratory apparatus. In 2 parallel series of 9 te each, run for 50 days, the actual manipulative time the series on peat mats, including final cutting te was only 85 percent of that required for the series sand flats. Like sand flats, the peat mats are adap to the testing of large seeds for which Jacobsen germi tors are not suitable. Adequate moisture is m readily maintained in the mats than in the sand fla Seeds set to germinate on peat are less subject to m than those set up on paper or cloth substrata.

The germination of many kinds of seeds is haste and improved by stratifying the seeds in moist peat, low temperatures, for a month or two before testi The mat to be used for the germination test may a be used for stratification, thus eliminating the trans of moist seeds from one medium to another. T seeds are counted while still dry and easily handl set up on the mat in position for the germination te refrigerated for the desired period, and removed to germination room without further manipulation.

The peat mat used by the station is 19 by 19 square by 2 cm thick, and fits loosely into a squ glass baking dish which is covered by a pane of ordina window glass during the test. The mat is molded a form consisting of 10 triangular wooden strips 1 cm long, 6 mm wide at the base, and 4 mm from b to apex, tacked on a board parallel to each other a 1.6 cm apart from apex to apex. A square frame collar of galvanized screen wire, 2 cm deep and 19 on a side, is held in position around the block of stri by four headless nails driven vertically into the boa

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[1] Barton, Lela V.: Hastening the Germination of Southern Pine See Journal of Forestry 26(6):774–785, illus. 1928.

round this wire frame a snugly fitting square wooden ame is slipped to keep the wire from bulging. Moisned peat is packed into the frame and down upon ie triangular strips, and is compressed with the hands to a firm mat 2 cm deep. The apparatus is inverted, e board with the strips is gently lifted off, and the mpleted peat mat and its wire border are carefully ished out of the square frame into the glass dish. he triangular strips leave what is now the upper surce of the mat marked with 10 equally spaced grooves drills, in each of which 25 to 50 seeds, depending on ze, may be planted.

By keeping a trace of free water in the bottom of the sh at all times it is possible to maintain nearly ideal oisture conditions at the top of the mat throughout e tests.

onderosa Pine Makes Rapid Volume Increase After Cutting

By Quincy Randles, United States Forest Service

An increase of 78 board feet per acre per year was corded on an area of timberland in the ponderosa ie type in New Mexico between 1923 and 1932. At e time of cutting (1923), the reserved stand, consisting ponderosa pine, Douglas fir, and white fir, was ıised and showed a net volume per acre of 1,123 board t. In 1932 the volume per acre had increased to 30 board feet. This rather large increase in volume made up by the total volume of new trees becoming merchantable size during the period plus the increase the merchantable-sized trees reserved at the time of tting. In 1923, timber stands were marked heavier an is now the practice; however, there was a good nd of seedlings, saplings, and poles left on the area at ie of cutting. Almost the entire area is now reported be fully stocked.

The change in the number of trees per acre by species and by broad diameter classes is shown in the following table:

Diameter classes (inches)	Number of trees per acre					
	Ponderosa pine		Douglas and white fir		Totals	
	1923	1932	1923	1932	1923	1932
12 to 20	10. 195	14. 367	0. 805	1. 894	11. 000	16. 261
20 to 27	. 881	1. 191	. 003	. 137	. 884	1. 428
28 and more	. 081	. 131	. 001	. 050	. 082	. 181
Total	11. 157	15. 689	. 809	2. 081	11. 966	17. 870

This table shows an increase of 5.9 trees per acre of more than 12 inches in diameter during the period and a gratifying diameter increase in the broad diameter classes.

National Monument to Preserve Giant Cactus

A national monument created to preserve a representative stand of desert flora, including especially the giant cactus, or saguaro, has been placed under the administration of the Forest Service. The area, named the Saguaro National Monument, comprises about 60,000 acres on the slopes of the Santa Catalina Mountains about 25 miles northeast of Tucson, Ariz., and mainly within the Coronado National Forest.

Some of the specimens of saguaro on the area are believed to be more than 100 years old. The huge fluted green columns are sometimes 60 feet high and in May are crowned by creamy white blossoms. The fruit is palatable and is used as a food by Indians.

General Forest News

ıe Emergency Conservation Program Gets Under Way

"An act for the relief of unemployment through the rformance of useful public work and for other purses" was approved by President Roosevelt March 31, 33. Its purposes are clearly indicated in the act elf, by which the President is authorized, "for the rpose of relieving the acute condition of widespread tress and unemployment now existing in the United ıtes, and in order to provide for the restoration of the ıntry's depleted natural resources and the advancent of an orderly program of useful public works, * * under such rules and regulations as he may escribe and by utilizing such existing departments or encies as he may designate, to provide for employing citizens of the United States who are unemployed, in the construction, maintenance, and carrying on of works of a public nature in connection with the forestation of lands belonging to the United States or to the several States which are suitable for timber production, the prevention of forest fires, floods, and soil erosion, plant pest and disease control, the construction, maintenance or repair of paths, trails, and fire lanes in the national parks and national forests, and such other work on the public domain, national and State, and Government reservations incidental to or necessary in connection with any projects of the character enumerated, as the President may determine to be desirable: *Provided*, That the President may in his discretion extend the provisions of this act to lands owned by counties and municipalities and lands in private ownership, but only for the purpose of doing thereon such kinds of cooperative work as are now provided for by acts of Congress in preventing and controlling forest fires and the attacks of forest tree pests and diseases and such work as is necessary in the public interest to control floods. The President is further authorized, by regulation, to provide for housing the persons so employed and for furnishing them with such subsistence, clothing, medical attendance and hospitalization, and cash allowance as may be necessary, during the period they are so employed, and, in his discretion, to provide for the transportation of such persons to and from the places of employment. That in employing citizens for the purposes of this act no discrimination shall be made on account of race, color, or creed; and no person under conviction of crime and serving sentence therefor shall be employed under the provisions of this act. The President is further authorized to allocate funds available for the purposes of this act, for forest research, including forest products investigations, by the Forest Products Laboratory."

In setting into motion machinery to carry out the law, President Roosevelt issued on April 5 an Executive order with the following provisions:

> (1) For the purpose of carrying out the provisions of said act Robert Fechner is hereby appointed Director of Emergency Conservation Work * * *.
>
> (2) The Secretary of War, the Secretary of Agriculture, the Secretary of the Interior, and the Secretary of Labor each shall appoint a representative, and said representatives shall constitute an advisory council to the Director of Emergency Conservation Work.
>
> (3) There is hereby established in the Treasury a fund of $10,000,000 by the transfer of an equal amount from the unobligated balances of the appropriation for emergency construction of public buildings contained in the act approved July 21, 1932, as authorized by section 4 of the said act of March 31, 1933, which fund shall be subject to requisition by the said Robert Fechner, as Director of Emergency Conservation Work, on the approval of the President.
>
> (4) Subject to direction by the President, supplies and materials of the several departments or establishments shall be furnished on the requisition of the Director of Emergency Conservation Work, and the departments and establishments furnishing such supplies and materials shall be reimbursed therefor in accordance with instructions of the President.
>
> (5) Reimbursement, if any, to the departments or establishments for other services rendered shall be made in accordance with instructions of the President.

It is provided in the law that the authority granted the President therein shall continue for a period of not longer than two years.

The Labor Department is in charge of the enrollment of the 250,000 men to be employed under this legislation. Each State is assigned a quota. The men are selected by the State official in charge of unemployment relief from the existing lists of applicants for work or relief. Until these lists are exhausted no further applications will be received. The work is to be given first to men between the ages of 18 and 25 who are citizens of the United States, unmarried and unemployed, who wish to allot a substantial part of their $30 a month compensation to their dependents. In ad tion there will be selected a certain number of ol men, married or unmarried, who live near the natio forests or national parks, are unemployed, and w have had actual experience in work in the forests.

After enrollment, which is for a 6-month period, t men are sent to Army recruiting stations where th are given a physical examination before they finally accepted. Those accepted are sent on to War Department concentration camp for a 2-we period of conditioning. This consists of setting- exercises, hikes, and some manual labor. Here t men are also instructed to some extent in the wo they are to do in the forests. The Army will al furnish the camp equipment, the supply service, a the management for the forest camps.

In the national forests the work will be under t supervision of the Forest Service of the United Stat Department of Agriculture. In national parks t National Park Service of the Department of the I terior will be in charge. The men will work 8 hours day (including travel to and from work and the lun period) for 5 days a week. Projects include maki trails, paths, minor roads, and firebreaks; improveme of timber stands by thinning; tree planting; timber su veys; development of public camp grounds; constru tion of range fences; elimination of fire hazards; co struction of telephone lines; eradication of tree pes and diseases; construction of fire towers and shelte and landscaping in park areas. The men will al be subject to emergency calls at any hour of the day night to fight forest fires. None of this work is "ma work" intended merely to keep men busy. It is necessary public work which will help put the fores in a productive condition that would ordinarily ha taken decades to attain.

Sites for camps in national forests were the first be approved. Fifty sites, all in region 7, were approv April 12; 57 more, in regions 7 and 9, were approv April 19. On April 20, the number of camp sites a proved brought the total number to be established national forests to 645, of which 538 will be in Western States. The number of camps to be esta lished in each State is as follows:

Alabama, 3; Arizona, 28; Arkansas, 12; Californi 166; Colorado, 30; Florida, 3; Georgia, 5; Idaho, 10 Louisiana, 2; Maine, 1; Michigan, 10; Minnesota, 1 Mississippi, 2; Montana, 25; Nevada, 4; New Ham shire, 6; New Mexico, 23; North Carolina, 10; Okl homa, 1; Oregon, 65; Pennsylvania, 5; South Carolin 1; South Dakota, 13; Tennessee, 7; Utah, 20; Vermon 2; Virginia, 10; Washington, 42; West Virginia, 7; Wi consin, 5; Wyoming, 22.

On April 6, in response to telegrams sent to t governors of States by Secretary of Agriculture Wallac State foresters, conservation commissioners, and othe representing the governors met in Washington for conference to formulate plans for utilizing part of t 250,000 men on State lands. Such work as may ndertaken on State and private lands will be adminis-red by State agencies, usually the State foresters. ifty-four camps have been approved in the State rests of Pennsylvania. A total of 350 camps on State nd private lands has been recommended.

The regional foresters of the nine national forest gions have been specially designated to cooperate ith the War Department, to approve project plans, nd to requisition men and equipment for the camps national forests. To perform these same functions connection with the work on State forest lands istrict Forest Inspectors G. T. Backus, E. M. Bruner, J. Eberly, C. F. Evans, and C. R. Tillotson have en appointed in their respective Forest Service arke-McNary inspection districts.

In addition, the following men have been appointed presentatives of the Director of Emergency Conser-tion to act as liaison officers at the headquarters of e various Army Corps Areas: F. L. Haynes, in charge acquisition for the Massachusetts department of nservation, First Corps Area, Boston, Mass.; Nelson own, professor of forest utilization, New York State ollege of Forestry, Second Corps Area, Governor's land, N.Y.; F. W. Besley, State forester of Maryland, d K. E. Pfeiffer, assistant State forester of Maryland, puty, Third Corps Area, Baltimore, Md.; W. P. ramer, assistant supervisor of the Pisgah National orest, Fourth Corps Area, Atlanta, Ga.; L. F. Kellogg, the Central States Forest Experiment Station, Fifth orps Area, Columbus, Ohio; John McLaren, regional rest inspector, region 9, Sixth Corps Area, Fort eridan, Chicago, Ill.; H. D. Cochran, assistant chief forest management, region 2, Seventh Corps Area, naha, Nebr.; John D. Guthrie, assistant regional rester, region 6, Eighth Corps Area, Fort Sam Hous-n, San Antonio, Tex.; and C. B. Morse, assistant gional forester, region 4, Ninth Corps Area, the esidio, San Francisco, Calif.

Is Nicotine Good for Seedlings?

By R. S. MADDOX, Assistant Forester, Virginia

During my connection with the State forestry work Tennessee, I noticed that in the western part of the ate, where dark tobacco is grown, small grain such as e, wheat, and oats thrived better on bare fields from ich tobacco had been harvested than on adjacent eas which had not contained tobacco. (These fields e referred to as "bare" because tobacco is usually ltivated so free from weeds and grass that after the op is harvested little or no vegetation is left except ubs of tobacco stalks and their roots.) It was also served that portions of grain fields and lawns about ellings in Tennessee produced more luxuriant owth where tobacco stalks had been spread than ewhere. In view of these observations it occurred me to experiment with nicotine on young trees in the rsery.

On July 7, 1932, two sections of a bed of young hemlock in the Virginia nursery that had germinated during April and May were treated with different forms of nicotine. The bed was 100 feet long by 4 feet wide, and each treated section was 12½ feet long. A small parcel of tobacco leaves was dried and crumpled into small particles. One section was spread with one fifth of a pound of these crumpled leaves and immediately sprinkled with water; the other was sprinkled with 4 gallons of water containing 2 teaspoonfuls of Black Leaf 40, a nicotine sulphate solution.

In the fall the two treated sections each contained two or three times as many trees as the untreated sections of the 100-foot bed, and the trees were thriftier. The soil of the entire bed when planted was, as nearly as I could determine, of the same consistency, fertilizer and seed were equally distributed, and the same cultivation and attention were given during the year except for the special treatments. There was no variation between the two sections because of the different methods of application of the nicotine.

Similar treatments were applied to arborvitae, Scotch pine, and Norway spruce, with no distinguishable results. Whether the better growth of the two groups of hemlock seedlings was due to the nicotine or just happened cannot be definitely decided without further experimentation. Perhaps an earlier application of the tobacco would have given a better opportunity for a conclusive determination.

Salt Spray Damages Vegetation on Cape Cod

By RALPH C. HALL, United States Bureau of Entomology

A northeastern gale that struck Cape Cod on September 8, 1932, deposited salt spray from the Atlantic Ocean on vegetation as far back as 6 miles from the coast, killing many plants, including trees. The wind, the velocity of which was estimated at 65 miles per hour at the Chatham Coast Guard Station and at 75 miles per hour at the Wood End Coast Guard Station, carried the spray over the entire land area of the cape. Though accompanied by only a small amount of rain, the storm was the worst in many years. Three and a half miles from the ocean, the windows of Shoot Flying Hill lookout tower were clouded with salt, according to Sam King, forest fire patrolman.

Soon after the storm, all the vegetation on the north and east shores of the cape within several hundred yards of the ocean turned brown. The leaves of practically all plants were killed, with the exception of those of pitch pine. Woody plants, including poison ivy, bayberry, beach plum, sweet fern, hog cranberry, blueberry, and huckleberry, appeared to be about equally affected by the salt spray. The pitch pine needles showed a slight burning at the tips on trees adjacent to salt water, but trees at a distance greater than half a mile were not affected. The most severe damage to pitch pine foliage was noted north of Provincetown near Race Point, where trees exposed on the north or east showed considerable burning. Leaves of the apple seemed to suffer more than those of any other species; practically all the foliage in an apple orchard 6 miles from salt water was completely killed. Shade-tree elms suffered considerable damage up to a distance of 2 miles from the sea, dropping practically all their foliage within a week.

The storm did an enormous amount of damage to cultivated flowering plants all over the cape, especially in the near vicinity of the ocean. One landscape gardener at Chatham lost his entire gladiolus crop through the burning effect of salt spray.

Of the conifers observed (Scotch, white, Norway, and pitch pines, Norway spruce, and larch), the white pine appeared to suffer the greatest amount of damage to its foliage. Several instances were noted where white pines at distances as great as 5 miles from the ocean showed some burning on the northeast side of the trees.

Occurring as it did near the end of the growing season, the storm caused less serious damage than it would have earlier in the summer. Such a storm is too unusual an occurrence to be considered as a factor seriously affecting deciduous growth. During the winter months severe storms of this kind are frequent, but their effects would be apparent only on conifers. All over the cape may be seen dominant white pines with their tops dead down to the surrounding tree growth. It is possible that the salt spray carried by these winter storms has been a contributing factor in the death of the tops of these trees, since white pine shows low resistance to salt burning.

Entomological Factors Affect Salvaging of Fire-Injured Trees

By Kenneth A. Salman, United States Bureau of Entomology

The results of a study of 148 selected fire-injured ponderosa pines recently completed by the Bureau of entomology in the Modoc National Forest, Calif., may prove of considerable aid in future marking of fire-injured trees for salvage. The record was taken on the site of the Sugar Hill fire of July 1929 during the 4 years 1929–32 and covers the time of readjustment and recovery following the fire injury. Although the stand remaining after any fire will present conditions peculiar to the particular situation and will require special treatment, some conclusions resulting from the study may be of general application.

Mortality of fire-injured trees from insect attack was found to be greatest during the first and second years following the season in which the fire occurred. A resumption of more nearly normal conditions of insect activity was observed in the stand during the third year after the fire.

The types of fire-injured trees that should be mar
for salvage on any given fire area will depend to a la
extent on the material that is left on the area. T
that have suffered 100 percent defoliation and
have had most of the buds killed will succumb with
further injury by insects and should be salvaged. T
that have suffered no fire injury should not be
unless the lumbering operation is directed toward
vesting the stand in addition to the salvage of inju
material.

Fire-injured trees that might survive if not attac
by insects have, according to the results of the stu
different degrees of susceptibility to insect atta
Mortality due to the western pine beetle (*Dend*
tonus brevicomis Lec.), the species chiefly responsi
for the insect damage to trees in the area studi
varied significantly with the amount of foliage inj
and more particularly with the amount of cambi
injury caused by the fire. When foliage injury al
occurred, trees having 0 to 25 percent of the foli
injured lost only 8.7 percent of the total number
trees in that class, while those having the same amo
of foliage injury but relatively heavy cambium inj
suffered a 10 percent loss. In the group of trees w
25 to 50 percent foliage injury, those with slight ca
bium injury lost 3.6 percent, while those with moder
to heavy cambium injury suffered a loss of 13.3 p
cent of the total. In the group with 50 to 75 perc
foliage injury the loss was 18.2 percent for those wi
out cambium injury and 37.5 percent for those w
that type of injury. The most severely injured gro
studied—that having 75 to 100 percent of the folia
and a small proportion of the buds killed—lost 1
percent of the total number of trees in the class, wh
those with cambium injury in addition to the folia
injury lost 72.2 percent.

The relative probability of recovery without ins
attack is indicated by the following list, which p
gresses from the least susceptible type to the m
susceptible:

- 0 to 25 percent defoliation, no or slight ca bium injury.
- 25 to 50 percent defoliation, no or slight ca bium injury.
- 0 to 25 percent defoliation, moderate to hea cambium injury.
- 25 to 50 percent defoliation, moderate to hea cambium injury.
- 50 to 75 percent defoliation, no or slight ca bium injury.
- 75 to 100 percent defoliation, no or slight ca bium injury.
- 50 to 75 percent defoliation, moderate to hea cambium injury.
- 75 to 100 percent defoliation, moderate to hea cambium injury.

Although the severity of the injury and the numb
of trees left on the area determine to a great exte

e types of fire-injured trees that should be salvaged, e results of this study indicate that in general it ould pay to salvage the following classes, as the ances are great that otherwise they will succumb insect attack:

Trees having more than 50 percent defoliation and oderate to heavy cambium injury; and trees having to 100 percent foliage injury and no or slight cam- um injury.

The salvage of trees having 50 to 75 percent foliage jury but no or slight cambium injury, and those with to 50 percent foliage injury with moderate to heavy mbium injury would depend on the number of trees be left for reseeding the area. Unless an unusually avy stand of fire-injured trees in the less seriously jured groups is left by the fire, it would not pay to rvest individuals in these groups.

rincipal Recommendations of Nancy Forest Research Congress

Among the recommendations of sections and com- ttees adopted by the plenary session of the Congress the International Union of Forest Research Organi- tions held in Nancy, France, in September 1932, ose on the following subjects are of particular interest American foresters:

Unification of descriptions of forest stands.—A com- ttee of three members was appointed to study this bject and to develop unification in methods of forest search.

Origin of forest tree seeds.—Research stations are to ntinue to exchange seeds for scientific purposes rough the secretariat general of the Union. Govern- ents will be requested to adopt international stand- ds for guaranteeing the control and origin of seeds.

Methods of testing forest tree seeds.—The international mmittee is to consider the advisability of holding a mposium at the next congress in which each country State would briefly describe the best methods of sting forest tree seeds used in that country, together th suggestions as to the effectiveness of the methods nployed.

Expansion of national parks.—"Biologists generally cognize the value of areas of natural vegetation, es- cially of virgin or natural forest stands, in indicating e development and working of natural laws and prin- ples in biology. It is therefore urged that the con- tuent members of the congress use their influence to tain the reservation of natural stands of forest ade- ate to portray the development and working of the tural laws and principles in the different types of rest in the various countries of the world."

Wood tests.—In view of the great variety of methods w applied in physical and mechanical tests of woods, hich render it difficult to compare the results of tests ade in different laboratories, the matter of unification of methods and presentation in figures of the results will be made a subject of study in the various research organizations of the Union and will be submitted for discussion to the next congress for the purpose of arriving at a standardization of methods.

Study of root systems.—Special attention should be given by the various stations to the morphological, physiological, and ecological study of the root systems of the species forming the principal types of forest vegetation, particularly in arid, subtropical, and tropical regions.

Nomenclature of humus layers.—Two principal types of humus are to be recognized hereafter—mull and raw humus. Mull has but one layer with two subtypes, real mull and surface mull. Raw humus consists of two layers: a fermentation layer, and a humified layer which can itself be subdivided into fine humus, greasy humus, and fibrous humus.

Podsolized soils.—A committee of 11 members was appointed to study podsolized soils, especially those which have a layer of hardpan, to determine the most suitable methods for assuring their use.

The next congress is scheduled to be held in Hungary in 1936.

Redwood Has Few Insect Enemies

By Hubert L. Person, United States Forest Service

In this age of insects, the redwood (*Sequoia sempervirens*) compared with other tree species is remarkably free from this form of attack. There are no so-called primary insects which attack this species seriously, and it is doubtful if any redwood tree has ever been killed by insects alone. This relative immunity probably contributes to no small extent to the longevity of the species. A few insects of minor importance, however, are known to feed upon the foliage, the bark, the bark and wood, or the wood of the redwood tree.

Of these groups, the bark and wood feeders are probably of most importance. Two bark beetles of the family Scolytidae mine the cambium and the outer sapwood of the branches of injured trees and occasionally assist in the killing of parts of a weakened redwood tree. Both species belong to the genus *Phloeosinus*, the most common being *P. sequoiae* Hopk. and the other *P. cupressi* Hopk.

The only other insect which feeds on the bark or cambium of living trees is the redwood pitch worm, one of the Lepidoptera. The species is *Vespamima sequoiae* Hy. Edw., and the adult resembles a yellow jacket. The larvae are a yellowish white and bore through the cambium of the branches, usually around the nodules, forming a pitch mass and often killing the outer part of the branch. This damage is probably not very common.

There are a number of the Coleoptera and one of the Hymenoptera which bore in the sapwood or heartwood of dead redwoods. Included in this group are two ambrosia beetles (*Gnathotrichus retusus* and *G. sulcatus* Lec.); one buprestid, the common anthaxia (*Anthaxia oeneogaster* Castelnow and Gary); five cerambycids—the redwood borer (*Judolia impura* Lec.), *Stranglia obliterata* Hald., *Leptura malthewsi* Lec., *Semanatus lignea* Fabr., and *Phymatodes nitidus* Lec.; and the western horntail (*Sirex areolatus* Cresson).

There are also a number of insects which feed on the foliage of living redwoods, but fortunately none of them have ever been known to injure the trees at all seriously. The most important member of this group is the redwood scale (*Aonidia shastae* Coleman). Ferris has reported this species as occasionally abundant on redwood foliage. The ivy or oleander scale (*Aspidiotus hederae* Vallot), and the black araucaria scale (*Chrysomphalus rossi* Maskell) are also found on redwoods at times. Some of the mealy bugs, especially the cypress and redwood mealy bugs (*Pseudococcus ryani* and *P. sequoiae*) also feed on redwood foliage, as does the redwood chafer or June beetle (*Dichelonyx valida*).

The following are good reference works on redwood insects:

- Essig, E. O.: Insects of Western North America. 1,035 pp., illus. New York, The Macmillan Co. 1926. (See host list, p. 931, Redwood.)
- Keen, F. P.: Bark Beetles of the Family Scolytidae. Mimeographed. (Copy can be obtained from J. M. Miller, 341 Giannini Hall, University of California, Berkeley.)
- Hopkins, A. D.: Insect Enemies of the Redwood. U. S. Bureau of Forestry Bulletin 38, pp. 32–40. 1903.

How Soon After a Fire Can Damage be Estimated?

It has long been realized that the damage resulting from a forest fire cannot be accurately estimated immediately after the fire except where destruction is complete. To determine how much time should elapse before a reliable estimate can be made, studies of experimental burns were conducted in 1931 and 1932 at the Michigan Forest Fire Experiment Station in cooperation with the Lake States Forest Experiment Station of the United States Forest Service. Results indicate that 3 to 4 months should elapse after a fire before damage estimates are made.

In making the study, repeat tallies at intervals of 1 month, 3 to 4 months, and 12 to 17 months were made on a number of fires in jack pine at the station. All plots tallied a month or less after burning showed heavy losses in all of the smaller sizes of trees, while the plots checked 3 to 4 months after burning showed little or no later loss.

As a rule, jack pines less than 2 feet high die at once if damaged at all, while those larger than 4 inches in diameter breast high recover if not completely scorched. Pines between these two size classes usually die if
percent or more of the crown is killed. It would app
that mortality is due primarily to crown damage, si
in no case was death traceable to butt injury al
except where the tree was mechanically weakened
repeated burning until it broke off or blew down.

These conclusions apply only to jack pine, since
resistance is not the same in all species.

Death Valley Now a National Monume

Death Valley, the lowest point in the United Sta
has become a national monument under the Natio
Park Service of the Department of the Interior
Presidential proclamation. The area of the n
monument is approximately 1,601,800 acres.

In spite of its name, this region is rich in plant l
nearly 500 species having been found there includ
the cactus, the yucca palm, the chuckwalla, a vari
of spring flowers, and a few rare plants which gr
nowhere else.

A species of mountain sheep inhabiting the val
closely resembles the Rocky Mountain species wh
habitat is above timber line. Pocket mice and ka
garoo rats are also common.

The vertical rise from the floor of the valley, whi
according to the United States Geological Survey
276 feet below sea level, to the top of Telescope Pe
11,045 feet high, also included in the monument, is t
greatest in the continental United States. There a
evidences of volcanic upheavals and of former extensi
lake beds in the valley. Borax, niter, and potash a
present in large quantities.

* * *

The use of sodium arsenite as an effective tree kil
has been rendered much easier through the inventi
of a 1-man tool which operates as easily and effective
as an axe. Further information concerning this to
which is being manufactured in central New York, c
be obtained from J. A. Cope, Cornell Universit
Ithaca, N.Y.

* * *

By presidential proclamation, 273,145 acres adjoi
ing the Grand Canyon National Park and the Kaib
and Tusayan National Forests were recently wit
drawn to form the Grand Canyon National Monume
which will be under the administration of the Nation
Park Service. The area lies largely north of the Col
rado River but includes a small block of public lan
south of the river between the Tusayan Forest a
Walpais Indian Reservation. The new monument
about 50 miles below the point from which the cany
is most commonly viewed, but provides a number
equally fine views of the canyon and of the riv
3,000 feet below.

Foreign Notes

he Part of Forestry in the Reclamation of Palestine

By **Bernard Frank**, United States Forest Service

In the program for restoring Palestine to economic oductivity, 7,500 acres of hilly, rocky land, unsuitle for crop production, is scheduled for afforestation. oout 1,500,000 trees have already been planted on me 1,700 acres of this area, which will be covered th forests as fast as money becomes available from e income of the "tree fund" to which Jews throught the world are voluntarily contributing. The folwing description of the afforestation activities in lestine is based on a letter from Dr. Joseph Weitz, rector of the afforestation department of the Agriltural Experiment Station of the Zionist Organizan, written in response to my request for specific formation on the subject:

The land which has been afforested or is reserved for forestation is rough and rocky. The rocks are genally of lime formation. The soil is shallow, somenes occurring in layers of only 12 to 14 inches. It is ddish in color when very loamy and grayish-white ien rich in lime.

The rainfall during the 6-month rainy season, ovember to April, averages 18 to 21 inches. During e rest of the year there is no rain whatever, but casional dews occur. The soil, if it is cultivated d a mulch formed on the surface, possesses the ility to retain humidity during the summer.

Both evergreen and deciduous species are employed r planting, the former being considered the more portant. The evergreens are, in order of their portance: *Pinus halepensis*, *P. pinea*, *Cupressus ramidalis*, *C. horizontalis*, *C. macrocarpa*, *Ceratonia iqua*, *Acacia cyanophylla*, and *A. longifolia*. The ciduous species are *Ailanthus glandulosa*, *Melia edarach*, *Robinia pseudoacacia*, *Morus alba*, and *. nigra*. About 80 percent of all the trees planted e *Pinus halepensis*, a native species which adapts itself ll to the differences in soil and climate of the country.

The evergreens are grown in local nurseries, the seed ing sown in September in boxes containing suitable il. Sprouting takes place in about one month, and February the seedlings are ready to be planted in ts or tins. The latter are about 3 inches deep by inches long and 8 inches wide, large enough for plants. They are watered during the summer nths. In December the seedlings are 8 to 14 inches gh, with good branch development, and are ready r permanent planting.

The seeds of the deciduous species are sown directly beds during February and March, with a distance tween rows of 16 to 20 inches. They are watered twice monthly and by December are 16 to 20 inches tall and ready for planting.

The afforestation sites are prepared by digging pits during October and November, before the rainy season begins. These pits are approximately 12 by 12 by 12 inches. Planting begins by the end of December, if 6 inches of rain has fallen. The evergreens are brought from the nurseries in the tins, taken out with the soil surrounding the roots, and placed in the pits. If the trees have been grown in pots they are taken out at the nursery, wrapped in paper, and packed in boxes, each box containing 150 to 200 trees. At the planting site they are taken out of the boxes, unwrapped, and planted. By February planting has been completed. Twice during the spring months the soil around the seedlings is hoed and all weeds destroyed. The deciduous trees are planted without earth balls and cared for in the same manner as the conifers.

As a general rule, 1,200 trees are planted per acre. The results depend chiefly on the amount of rainfall after February. If that is sufficient and the soil hoed in time, 85 percent survival is obtained. With insufficient rainfall survival may fall to 30 percent. The average survival has been 70 to 75 percent, and less than 70 percent is considered unsatisfactory.

Planting costs depend on the number of days required for the various operations. The afforestation work of the Jewish National Fund is carried out entirely by Jewish labor. The cost of producing 1,000 evergreen trees is estimated at £4 or £5. By planting the seeds direct in beds the cost can be reduced to £2 or £2½, but in that case the survival percentage is lower.

Under good conditions the native pine reaches in its sixth year a height of 10 to 13 feet and a diameter (1.6 feet above the ground) of 2¼ to 2½ inches. The Ailanthus, a rapid grower, reaches by the fourth year a height of 13 feet and a diameter of about 2½ inches.

* * *

The Institute for Foreign and Colonial Forestry, established at the Tharandt Forestry School in 1931 by the ministry of education of Saxony, Germany, is offering courses of instruction in forestry especially adapted for foreign students. A program of special lectures will be given during the summer term of 1933. Excellent facilities for research are offered by the institute, special work in allied subjects may be carried on in the Polytechnical University of Dresden (of which the forestry school is a division), and the school forest is at the disposal of students. Tours of forest regions of Germany or other European countries may be arranged. Detailed information can be obtained by addressing the institute at the Forstliche Hochschule Tharandt, Tharandt, Saxony, Germany.

Vast Land Improvement Project Under Way in Italy

A nation-wide development project known as "bonifica integrale" is in full swing in Italy, reports Arthur C. Ringland, European forestry specialist of the United States Forest Service. Through this great public work, all the land in that country is to be made to serve some useful purpose, directly or indirectly, and waste areas are to be completely eliminated. Plans include the control of mountain streams and run-off, checking of soil erosion on slopes, and irrigation and reclamation of all lands suitable to agricultural use. The purposes of the plan, as explained to Mr. Ringland by officials in Rome, are to redistribute the surplus urban population of Italy, provide employment for surplus labor, and to make Italy as nearly self-supporting as possible. Corrective work in the mountains, in which forestry plays an important part, is a basic phase of the problem.

The project is under the centralized direction of a special division in the Italian ministry of agriculture and forests. The original estimate of $400,000,000 will probably be much exceeded as will also the time allotment of 14 years for completion and 30 years for liquidation. Work has been completed or is under way on 1,000,000 acres and $150,000,000 has already been expended.

The improvement projects are carried out by the State or, more generally, by so-called "consortiums" of local - landowners. These consortiums are formed where the owners of at least one quarter of the area involved request the cooperation and help of the State. Expropriation can be enforced if in the public interest. The consortiums are enabled to borrow money from the Government at 2½ percent to the amount of 55 to 87½ percent of the capital investment required upon the basis of plans approved by the ministry. No project is independent; every unit of the work is an integral part of the whole plan.

Forest Management Plans of Five Countries Published

Plans for the management of the forests of Belgi
France, Hungary, Switzerland. and the Province
Quebec, Canada, have been published by the In
national Institute of Agriculture as the first vol
of a series undertaken in consequence of a resolut
passed by the first Congress of Silviculture held
Rome in 1926. The institute was requested by
resolution to publish "a series of practical and ex
examples of the management methods in use for
different types of forests, together with instructi
on this subject from the various forest administrati
of the world." This first volume will be followed
others containing the plans of other countries as t
are submitted.

The introduction stresses the need of knowing
improving on means and methods capable of assur
the continuity of revenues from the forest. The t
dency is noted in many countries to extend to priv
forests, in the public interest, legal requirements
management. For Belgium, France, and Hungary
legislative measures making obligatory the mana
ment of certain forests according to approved plans a
the text of official instructions relative to managem
and revision of plans are quoted. For Hungary
given also the instructions relating to the fixation
boundaries and surveying of landed forest property
well as two practical examples of plans of manageme
as used in that country for large and small forest are
As an example of the requirements imposed by
cantons of Switzerland those of the Canton of Va
are given.

The reports from the different countries are print
in full as submitted to the institute. The text is
French.

Personals

C. M. Granger, director of the Forest Survey of the United States Forest Service, has been designated by the Forester to take charge of the unemployment relief program as it affects the Forest Service.

Robert Fechner was appointed by President Roosevelt on April 5, 1933, Director of Emergency Conservation Work under the act for unemployment relief through forest work. Mr. Fechner is vice president of the International Association of Machinists and a lecturer on labor questions at Harvard and Dartmouth Universities.

Francis E. Williamson, Jr., forest ranger in cha
of recreation, Mount Hood National Forest, Ore
has been awarded the military decorations of t
Purple Heart and the Silver Star for bravery in acti
during the World War.

George M. Gowen has been transferred from the Ca
fornia Forest Experiment Station to the Lassen N
tional Forest, where he will succeed W. G. Durbin,
tired, as supervisor. Mr. Gowen is a graduate of t
California University School of Forestry. Enteri
the Forest Service in 1920, he has had wide experience
both administrative and research work in California.

Three national forest supervisors whose service gan in the early years of the century were retired on arch 1, 1933. They are William G. Weigle and ıarles C. Hall, of region 6, and William G. Durbin, of gion 5. Mr. Weigle, for the past 14 years supervisor the Snoqualmie Forest, Wash., is a graduate of the ıle Forest School. His Forest Service record includes ear as assistant chief of the branch of forest manage- ·nt; the supervisorship of the Coeur D'Alene National rest, Idaho; supervision of all Government forests in aska; and, since 1919, the supervisorship of the Sno- almie. Since his retirement Mr. Weigle has become perintendent of State parks of the State of Washing- ı.

Charles C. Hall began his career in 1906 as assistant est ranger in charge of the third district of the Hell ite Forest Reserve, Mont., under Supervisor E. A. erman. In 1907, he was promoted to be supervisor of Hell Gate and Big Hole Forest Reserves. In 1910, was transferred to region 3 and placed in charge of Alamo Forest. He reorganized this forest, and s given a similar assignment on the Carson in 1911. 1912, he was assigned to the Tonto Forest, becoming pervisor in 1913. In March 1916 Hall went to region s supervisor of the Santiam, where he remained until retirement.

W. G. Durbin entered the Forest Service in 1903 and er work as a cruiser and a ranger became assistant pervisor of the Plumas National Forest. He was n successively supervisor of the Plumas, the Modoc, d the Lassen, all in California.

Lithgow Osborne, publisher and editor, succeeds nry Morgenthau, Jr., as Conservation Commissioner New York. Mr. Morgenthau was appointed gov- ıor of the Federal Farm Board by President osevelt. John T. Gibbs, who has been secretary of conservation department since October 1931 was med deputy commissioner.

Samuel A. York has been appointed State forester of assachusetts to succeed W. A. L. Bazeley.

H. W. Shawhan was appointed on April 4, 1933, Chief rester of the West Virginia Game, Fish, and For- ry Commission to succeed J. W. K. Holliday. Mr. awhan is a graduate of the Biltmore Forest School. was for many years forester for the Ritter Lumber . in West Virginia.

Hugh P. Baker, president of the Massachusetts ate College, received the honorary degree of doctor laws from the New York State College of Forestry February 23, 1933. The conferring of the degree lowed exercises in the auditorium of the Louis arshall Memorial Building at which the building elf was dedicated and presented to the college and racuse University.

K. S. Trowbridge, from January 1930 to June 1931 tension forester of Georgia and later special agent at Darien, Ga., is now cooperative agent in naval stores for the Georgia Extension Service, with headquarters at the Georgia Coastal Plain Experiment Station, Tifton, Ga. His work is assisting naval stores' producers in their stilling problems and woods operations along lines recommended by the United States Bureau of Chemistry and Soils and the Forest Service.

Bonnell H. Stone, development agent for the Georgia Department of Forestry and Geological Development since its formation in January 1932 when the State Board of Forestry and the Geological Survey were consolidated, and prior to that time a member of the State Forestry Board, has been appointed extension forester of Georgia under a cooperative agreement between the Department of Forestry and the State Extension Service. DuPre Barrett will continue his work as extension forester for the University of Georgia, the State Department of Forestry, and the United States Department of Agriculture, but with his field restricted to the 48 counties in northern Georgia. Mr. Stone will have charge of forestry extension activities in the counties of central Georgia, with headquarters at Oxford, in Newton County. Extension work in the southern part of the State will be handled by K. S. Trowbridge in connection with his naval stores activities.

Rodney H. True, professor of botany and director of the botanical gardens at the University of Pennsylvania since 1920, has been appointed director of the Morris Arboretum, recently received by the university as a bequest from Miss Lydia Morris. Dr. True was at one time plant physiologist with the United States Department of Agriculture. Harlan H. York, of the faculty of botany of the university, formerly forest pathologist of the New York State Department of Conservation, has been appointed one of 4 members of the scientific staff of the arboretum. Dr. York will carry on research investigations in tree diseases. Other members of the staff are Edgar T. Wherry, ecologist; Conway Zirkle, geneticist; and John M. Fogg, Jr., taxonomist.

Officers elected for 1933–34 by the Allegheny section of the Society of American Foresters at its annual winter meeting held in Philadelphia, Pa., February 24–25, are: Karl E. Pfeiffer, assistant State forester of Maryland, chairman; William S. Taber, State forester of Delaware, vice chairman; H. F. Round, office of the forester of the Pennsylvania Railroad Co., secretary; and N. T. Kessler, assistant State forester of New Jersey, and A. C. McIntyre, of Pennsylvania State College, members of the executive committee.

The Appalachian section of the Society of American Foresters at its 1933 meeting elected C. F. Evans, district forest inspector of the United States Forest Service, chairman; F. H. Claridge, assistant State Forester of North Carolina, vice chairman; and I. H. Sims of the Appalachian Forest Experiment Station, secretary.

Eino Saari, professor of forest economics at the University of Helsinki, Finland, came to the United States in February for a period of study under a research fellowship in forest economics under the International Education Board of the Rockefeller Foundation. Professor Saari spent most of February and March at the Yale University School of Forestry. He plans to visit various institutions in different parts of country in order to acquire a first-hand knowledge our economic problems.

Officers of the Angeles Forest Protective Associati of southern California for 1933 are: H. W. Bak president; Worthy White, first vice president; a Harvey S. Bissell, second vice president.

Bibliography

The Schooling of Foresters

By Herbert A. Smith, United States Forest Service

In 1927 a special committee of the National Academy of Sciences conducted an inquiry into research in forestry. One outcome was a special report on forest education, prepared by Dean Henry S. Graves of the Yale School of Forestry. From this sprang the "Forest Education Inquiry" conducted under the auspices of the Society of American Foresters and financed through a Carnegie Corporation grant of $30,000. Its results are embodied in a volume [2] not only monumental in the history of forest education but also a notable contribution to the literature of higher education in the United States, from the broadest viewpoint.

In the April 1928 issue of the Journal of Forestry, Dean Graves pointed out at what the inquiry should aim. "Even a superficial study of our system of education in forestry", he said, "reveals numerous defects. Progress in remedying these defects and in strengthening our forestry institutions would be greatly aided by a study of our educational problems more far-reaching and more profound than has yet been made. * * * The objects of the proposed study would be to determine more specifically than has been done the educational requirements of the profession and whether our present system of training is suited to meet them; to obtain information that will aid the schools to clarify their objectives and special functions and to shape their courses accordingly; to determine how the schools may better coordinate their educational work with the needs of practice; and how they may improve their facilities for instruction and make effective their methods of teaching."

In short, the undertaking was to bring out how well the schools engaged in training professional foresters are doing their work, and how they might do it better. But the study was carried out along much broader lines than this suggests. Subprofessional as well as professional education is dealt with, and forest education for those who do not intend to make their living through the practice of forestry, as well as for those who do. Nevertheless, the main concern is with the educational equipment required in the United Stat to turn out an adequate supply of competent men f the various lines of work into which profession foresters will naturally go and in which they are neede

It is impossible within the space of a brief noti to indicate the thoroughness with which the ground covered or to point out even the major conclusion The bulk of the book is given to Part II, The Occup tions of Foresters, Part III, The Education of Forester and Part IV, Problems of the Forest Schools. A co cluding part summarizes illuminatingly, for compar tive purposes, the objectives, systems, and speci features of forest education abroad and the trainin given forest officers in various countries of Europ Part I briefly summarizes, in its second chapter, th history of forest education in the United States. I first chapter is less introductory than fundamenta It is the very cornerstone of the whole work. On and for all, it impregnably establishes the place forestry as an independent profession and the claim of forestry as a science occupying its own field.

Two sentences from the final paragraph make th matter clear. "The utilization of various sciences an arts by the forester has created misconception as to h exact position among the professions * * *. Th forester is a specialist in forest science, dealing with distinctive and unique problem, the solution of whic requires a highly organized body of science and specialized technique." Upon this conception it necessary to rear the structure of the forest school a an educational institution.

Preparing foresters properly for the practice of profession of this character requires forest schools wit adequate faculties, adequate financial resource adequate physical facilities, and adequate education objectives. Whether there are too many forest school is perhaps questionable, since the future requirement of the country for trained foresters is uncertain; but th number of weak schools is an indubitable ground fo dissatisfaction. There are 26 collegiate institution in the United States which offer work in forestry, an they have on their forestry teaching and research staff an aggregate of 164 persons; but 4 institutions hav more than one half the total and only in 6 institution do these staffs number more than 5 persons. A facult of at least 5 experienced and competent men, eac qualified to teach as a specialist in a particular sub ision of the field, is held by the authors of Forest ucation essential for an undergraduate forest school; t of the 23 institutions of this character 12 have ffs of less than 5 men and an aggregate of only 32. tabulated statement of the funds allotted to 24 ools for a single college year shows 3 schools with otments of more than $100,000 and 8 with allotments less than $10,000.

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[2] Graves, Henry S., and Guise, Cedric H.: Forest Education. Yale University Press, pp. XVII, 421. 1932.

The greatest weakness in forest education in the ited States is, beyond all doubt, its inadequate ancial support. That is something for foresters to nk about, and concern themselves about. Not it the situation can in other respects be left to take e of itself. The educational task and educational oblems to be grappled with in order to make forest ication what it should be are of very large propor- ns, as the work conducted by the Inquiry and now sented in published form makes abundantly clear; t that they have been so illuminatingly disclosed this study affords assurance of swift and well- ected progress, within the limits set by financial nsiderations.

Forest Bankruptcy in the States

By W. N. Sparhawk, United States Forest Service

Colonel Ahern has performed a valuable service in nging together, largely from official sources, a vast antity of information on the forest situation in each ate in his book, Forest Bankruptcy in America.[3] emphasizes especially the wood requirements of the ate and the ability of its forests to meet these requirements.

One may disagree with the implication that each ate should adopt a policy of economic self-sufficiency. appears to be no more logical for Iowa or Kansas or braska to grow all the wood they consume than for w York or New Jersey or Massachusetts to grow all their corn or beef or wheat. Yet perhaps this is no re unreasonable than the idea that Wisconsin, for tance, should base her forest policy merely on the antity of wood required within her own boundaries. e Forest Land Use in Wisconsin: Report of Wis- nsin Committee on Land Use and Forestry, 1932.) e very fact that some States cannot hope to meet ir own timber needs and that others cannot con- me all their forests will produce is one reason why estry is a national rather than a purely local problem. vertheless, it is unquestionably desirable that each ate utilize productively its forest land resources, and at timber be grown close to the point of consump- n so far as economically practicable.

Colonel Ahern proposes a four-point program, in- ding public regulation of cutting sufficient to pre- nt devastation; increased public expenditures for protection; extension and education; and greatly increased public ownership of forests. Although there may be different opinions as to the necessity for perpetuating our forests, most persons who are familiar with the situation will agree that if this is to be done nothing less than the proposed program will accomplish the result.

A Translation of Braun-Blanquet's Study of Plant Communities

By R. S. Campbell, United States Forest Service, and Imogene J. Campbell

American forest ecologists with a limited reading knowledge of German will welcome the recently published translation of Braun-Blanquet's Pflanzensoziologie by Fuller and Conard.[4] With its summary of the latest European work, the book should prove valuable to both field men and students. The need of the forester for such a book is indicated by the statement of the author: "The ultimate aim of every reasonable attempt to control vegetation, aside from purely aesthetic aims, consists in influencing with the least possible effort the conditions of the habitat so as to give permanently the greatest possible returns. But this goal can be approached only when farmers and foresters alike acquaint themselves with and apply the teachings of soil science and plant sociology."

The subject matter is divided into six parts, the first two of which deal with plant social life and organization of plant communities. Methods of analysis of the structure of plant communities given are along the more theoretical lines of plant sociology rather than the practical ones of forestry and agriculture.

Part 3 considers the dependence of plant communities upon one another and upon their environment. Factors of the habitat are treated under four heads: Climatic, edaphic or soil, topographic, and biotic. Research results and problems of interest to workers in agriculture and forestry are discussed.

Foresters have measured and correlated relative humidity with forest growth for long periods, but the relation of humidity to the transpiration of forest trees seems to remain uninvestigated. It is here suggested that the distribution of many climax communities is undoubtedly governed by the saturation deficit of the air. The author also states that the evaporating power of the air, although greatly underrated by practical foresters, is undoubtedly an extremely important factor in forest ecology.

In discussing the relation of forest boundary to wind effects it is suggested that many mistakes in reforestation might be avoided through a knowledge of the specific wind resistance of trees and their relation to the wind factor near the timber line.

Ahern, George P.: Forest Bankruptcy in America: Each State's Own ry; with a foreword by Gifford Pinchot. 319 pp. Washington, ., The Green Lamp League. 1933.

[4] Fuller, George D., and Conard, Henry S.: Plant Sociology (authorized English translation of Pflanzensoziologie by J. Braun-Blanquet; revised and edited). 405 pp., 180 figs., 42 tables. New York, McGraw-Hill Book Co., Inc. 1932.

Soil problems are treated in the light of the newer view that climatic factors are more important than the nature of the organic substratum in soil formation. Thus the production of organic matter and the kind and intensity of its effects are, like the soil-forming processes themselves, subject to the climate.

Erosion is briefly considered, with suggestions of types of soil which should be kept intact with their plant cover or reforested. The importance of soil texture and structure is emphasized. The maintenance of the crumb structure of the soil and the ecological effect of its oxygen and carbon dioxide content are treated from the forester's viewpoint. Results are quoted from Burger, who in examining air capacity of the soil always found that greater air capacity indicates a higher value in forestry and that the pore volume of the soil decreases considerably after deforestation.

Nitrification of forest soil, types of humus, effect of leaf litter and pH conditions favoring nitrification are discussed. Explanation is given for the acid reaction of sandy forest soils. The influence upon plant communities of exposure, or inclination toward the sky, is elaborated, including soil and soil-surface temperatures at various exposures with influence upon vegetation, decomposition, and seed germination.

Grazing, effect of the use of fire for pasture improvement, forest ranges, selective timber cutting, soil fauna and flora, and effect of animals upon vegetation, are briefly discussed.

Part 4 is concerned with the rise, development, and decline of plant communities. It is emphasized that a study of the development of vegetation is necessary before ecological experiments can be successful. An example of such an experiment is the stabilization and forestation of the wandering dunes south of Cape Sim on the Moroccan coast.

Part 5 treats of the geographic distribution of communities and the mapping of vegetation by line and belt transects. Part 6 concerns various classifications of plant communities.

Exhaustive search of literature is shown by the bibliography of nearly 700 citations, in which are included as far as possible the more important contributions of North American, English, and Russian scholars.

Two Books on Log Chutes

Methods of wood transportation are treated in two recent publications, one American, the other Austrian. Transportation of Wood in Chutes, issued as Yale University School of Forestry Bulletin No. 34, is by Alexander M. Koroleff and Ralph C. Bryant.[5] Part 1, written by Mr. Koroleff, contains descriptions of construction and operation of the types of wood log chutes that have been used in various parts of world. Methods of checking and accelerating velocity of chuted material are considered from practical point of view. Professor Bryant, in part discusses the technical side of chute construction a operation, including the engineering principles involv Part 3 contains a bibliography.

Wood transport in the mountains of Austria is v highly developed mechanically. In Riesanlagen u Seilbahnen (Log Slides and Cableways), by Leo Haus and Julius Duhm of the Hochschule für Bodenkult Vienna, slides, flumes, and overhead cableways described and illustrated. Every phase of the scienti construction and operation of these logging devices dealt with in this 320-page book. The text is German. Dr. Hauska is professor of engineering the hochschule.

Recent Publications of the Forest Servi

(These publications can be obtained from the Superintendent of Do ments, Washington, D.C., at the prices indicated.)

Technical Bulletin 342-T, Causes of Brashness Wood, by Arthur Koehler. 5 cents.

Technical Bulletin 343-T, Specific Gravity and Relat Properties of Softwood Lumber, by Edward C. Pec 5 cents.

Technical Bulletin 346-T, The Effect of Concentrati on the Toxicity of Chemicals to Living Organism by Ernest Bateman. 5 cents.

Farmers' Bulletin 1392-F, Black Walnut for Timb and Nuts, by W. R. Mattoon and C. A. Ree (Revised.) 5 cents.

Farmers' Bulletin 1697-F, Using Soil-Binding Plan to Reclaim Gullies in the South, by H. G. Meginni 5 cents.

Leaflet 86-L, Protect Hardwood Stands from Grazin by W. K. Williams. 5 cents.

* * *

The Tree Lover, a magazine "devoted to tree lo in all its aspects", is being published quarterly b Alexander Moring, Ltd., of London, the first issu having appeared in October 1932. The new periodic contains articles on forestry and trees from all parts the world and is attractively illustrated. The edit is the Rev. Canon Lonsdale Ragg, who has publishe two books of original drawings of trees. Subscriptio to the Tree Lover (at the rate of 5 shillings per yea including postage) may be sent to the publishers at 2 Cork Street, Bond Street, London, W. 1, England.

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[5] 139 pp., illus. New Haven, Conn. 1932.

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Announcements

American Forestry Association Plans Notable Meeting

With seven other conservation organizations participating, the American Forestry Association will hold its 1933 annual meeting in New Hampshire September 5–8. Members of the Society for the Protection of New Hampshire Forests, the Appalachian Mountain Club, the Massachusetts and Connecticut Forestry Associations, the Empire State Forest Products Association, and the New England and New York sections of the Society of American Foresters will gather with members of the association at Franconia, N.H., on September 5 for the opening event, a dinner at the Forest Hills Hotel, headquarters for the meeting. Following the dinner, addresses of welcome will be given by W. R. Brown, chairman of the New Hampshire Forestry Commission, and James E. Scott, supervisor of the White Mountain National Forest; and brief greetings will be delivered by representatives of various New England organizations. George D. Pratt, president of the American Forestry Association, will act as chairman on this occasion.

On September 6, a field trip is scheduled through the Crawford Notch State Forest, the Bartlett Experimental Forest (used as a field laboratory by the Northeastern Forest Experiment Station), and other points of interest. Secretary of Agriculture Henry A. Wallace and Dean Henry S. Graves of the Yale School of Forestry will address an evening session.

Another inspection tour, on September 7, will include visits to the Gale River Experimental Forest, where members of the Northeastern Forest Experiment S tion staff will explain some of the studies under way; a national forest timber sale area; a wild-life restorati project; the Lost River reservation of the Society the Protection of New Hampshire Forests; and Franconia Notch and the Flume. A stop for lunche will be made at the Wildwood Emergency Conser tion Camp, where Robert Fechner, director of em gency conservation work, R. Y. Stuart, United Sta Forester, and Senator David I. Walsh, of Massach setts, will speak briefly. An open discussion on topic "Recreational Uses of the White Mounta Forest" will be held that evening at the hotel.

The last trip of the meeting, on September 8, will to another emergency conservation camp and to 650-acre timber sale area where spruce and hardwoo were cut in 1925–27. The meeting will disband af a scenic drive and a luncheon at Mount Washingt Hotel at which Gov. John G. Winant of New Ham shire will act as toastmaster.

* * *

The council of the Save-the-Redwoods League w hold its annual meeting on the last Thursday of Augu which this year will be August 31. The meeting w be held at 114 Sansome Street, San Francisco, Cali in room 627.

* * *

The Central States Forestry Congress is schedul to meet September 21–23, 1933, at the Hotel Sherma Chicago, Ill.

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State Forestry

Vork Has Begun in State Emergency Conservation Camps

efore he approved any of the emergency conserva- camps proposed by the States for projects on State privately owned lands, as authorized in the Un- loyment Relief Act of March 31, 1933, the director mergency conservation work sent the following gram to the governors of all States on May 5, 1933, ining the conditions under which such camps might stablished:

> efore approving emergency conservation work ects on State, county, and municipally owned , the President desires assurance that you will the State legislature, if now in session, or if not, at next succeeding session, to enact legislation pro- ng that if as a result of the work done the State ves a direct profit from the sale of the land or its lucts the proceeds will be divided equally be- n the State and the Federal Government until the e shall have paid for the work done at the rate of er man per day for the time spent on projects sub- to a maximum of $3 per acre. President desires no work shall be done on privately owned land pt as may be necessary in the public interest for onal or State-wide forest protection against fire, ts, and disease and/or simple flood control meas- to arrest gully erosion and flash run-off at head- rs of mountain streams. Where public interest ands work on privately owned land for these pur- s the President requests that it be conditioned on e assuming responsibility for maintenance of works andowners or otherwise and obtaining contracts the landowners by which the State reserves the to remove at its option and without recompense andowners any structures or other things of re- able values which may result from the work done, ding products of trees planted to arrest erosion. se wire at your earliest convenience whether you e to this plan.
>
> ROBERT FECHNER,
> *Director of Emergency Conservation Work.*

he governors of all States involved agreed to these litions, and 755 camps have been approved for on State and private lands.

he camps are divided into four types—those on e forests, those on State parks, those on private for forest work, and those on State or private land rosion or flood-control work. The total number mps in each of these categories is: In State forests, 309; in State parks, 101; on private forest land, 221; and for flood control, 124. The number of camps of all types in each State is as follows:

Alabama, 14
Arkansas, 7
California, 27
Colorado, 2
Connecticut, 12
Florida, 15
Georgia, 30
Idaho, 22
Illinois, 33
Indiana, 21
Iowa, 16
Kansas, 7
Kentucky, 13
Louisiana, 20
Maine, 12
Maryland, 10
Massachusetts, 27
Michigan, 45
Minnesota, 37
Mississippi, 12
Missouri, 15
Montana, 1
Nebraska, 5
New Hampshire, 5
New Jersey, 8
New York, 33
North Carolina, 11
North Dakota, 7
Ohio, 17
Oklahoma, 12
Oregon, 8
Pennsylvania, 89
Rhode Island, 3
South Carolina, 16
South Dakota, 5
Tennessee, 13
Texas, 34
Utah, 5
Vermont, 10
Virginia, 26
Washington, 15
West Virginia, 8
Wisconsin, 26
Wyoming, 1

These camps are under the supervision of the State forestry departments, the work in State parks being subject to the approval of the National Park Service of the Department of the Interior and that in the other camps to approval by the United States Forest Service. The Bureau of Agricultural Engineering is cooperating in the erosion control work by giving instructions in the building of dams.

A somewhat wider range of projects will be carried out on State forests than on private lands; for instance, tree planting, forest, timber, and range survey, and timber-stand improvement will be carried out on the former but not on the latter. The principal classes of work authorized for all projects are: Preventing and fighting forest fires; fire-hazard reduction (on private lands this does not include any slash disposal or other hazard removal required of the landowner under State law); telephone-line construction (for fire protection); erection of lookout towers and observatories; construction of protective structures, such as cabins and tool sheds; truck-trail construction; horse-and-man-trail construction; development of emergency fire-control landing fields; firebreak construction; control of insect epidemics; control of blister rust and other tree disease epidemics; erosion and flood control; and maintenance and reconstruction, as well as construction, of the authorized classes of improvements.

New Minnesota Law Adds to Number of State Forests

By an act of the 1933 Legislature, four new State forests were created in Minnesota and changes were made in the area and boundaries of many of those previously established. There are now 19 State forests in Minnesota, with a gross area of 3,737,000 acres, of which the State now owns 1,082,000 acres. According to the new law, these forests are to be administered "for the purpose of preserving, propagating, and breeding wild life of all suitable kinds, including all species of game, fish, and fur-bearing animals, and birds of rare and useful species, and especially for the development of forests and the prevention of forest fires * * * and for the protection of watershed areas, valuable for domestic and commercial uses, and for the establishment and development of recreational areas."

Other acts passed at the 1933 session provide for the exchange of lands acquired by the State under the tax delinquency laws for private land in consolidating State holdings; for the acquisition of the State by gift, purchase, or condemnation of tracts of land for firebreaks (amending a law authorizing such acquisition for lookout towers, buildings, and other uses); for the return of 50 percent of the gross receipts from any State forest to the county where such forest is located; and for the extension of the period of redemption of lands sold for taxes from 5 to 7 years.

Recent Land Purchases in New York

An area of 4,037 acres in St. Lawrence and Hamilton Counties has been purchased by the State of New York to be added to the Adirondack Forest Preserve. The land was the property of the Atherton Forestry Co. of New York City.

Unusual recreational values are found in this region. Big Trout and Little Trout Ponds and 2½ miles of the Bog River, an excellent fishing stream, are included in the tract, which is easily accessible to transportation facilities.

In line with the State conservation department's policy of securing as rapidly as they can be obtained at reasonable prices the lands upon which forest-fire observation stations are located, a ½-acre tract in the town of Moriah, Essex County, in the Adirondack section, has been acquired. The Belfry Mountain State fire-observation station is located on this area. A 12-foot right of way from the public highway to the station is included in the purchase.

Arkansas' First State Forester

On July 1, 1933, the first State forester of Arka
entered upon his duties. The appointee is Charle
Gillett, who since 1929 has been extension foreste
Arkansas. Mr. Gillett is a graduate of the Co
school of forestry, from which he received the de
of M.F. in 1929. He was extension forester of N
Dakota from 1925 to 1928.

The act of the Arkansas Legislature providing f
State forestry commission and a technically tra
State forester was passed in March 1931, but no f
were appropriated at that time. The present app
ment is on the basis of $8,000 raised by pri
subscription.

Alabama Passes an Enabling Act

An act of the Alabama Legislature authorizing
Federal Government to extend purchases of land
national-forest purposes to include lands in the
nessee River Valley in Alabama was approved by
governor April 10, 1933. Prior to the enactmen
this law the Federal Government was limited in acq
tion of new lands in the State to areas within the pre
exterior boundaries of the existing Alabama Nati
Forest.

Gypsy Moth Rediscovered in New Jer

After 4 years during which no signs of the gy
moth had been found in New Jersey and the State
considered to be free of any infestation of the in
employees of the State Department of Agricul
recently discovered a gypsy moth egg mass near M
Freedom, in Morris County. It is believed that
egg mass represents wind dispersion from an un
covered colony, probably within several miles of
discovery. Scouting is being done to locate the pa
infestation.

* * *

The European pine shoot moth continues to c
extensive and serious damage to Norway pines in
York. The insect has been distributed with infe
nursery stock, and is now established in ornam
plantings in or near most of the larger cities of
State, as well as on many afforested areas, accordi
the United States Bureau of Entomology.

* * *

Dates of open seasons for almost all varieties of
game in New York were changed by the State Le
lature at its last session. In many cases the cha
increases the length of the season from the pe
October 25 to November 15 to the entire mo
October 15 to November 15.

w Jersey Relief Cooperation Helps Private Woodland Owners

n cooperation with local and county relief agencies, forestry division of the New Jersey Department of servation and Development has developed a plan reby privately owned timberlands and woodlands he State are being made more productive by im-vement cuttings without cost to the owners. tematic thinnings are badly needed on many of e lands after years of careless cutting and abuse ng which the owners have been unable or unwilling nake the necessary expenditure to have such work e.

any relief agencies in the State have organized d-cutting gangs to cut fuel wood for local distribu-. The forestry division locates suitable woodlands owners of which are glad to have the work done and willing to donate the wood in return. The divi-'s foresters mark the trees to be cut and supervise work to insure satisfactory conduct of the operation. his particular type of cooperative service was ated last year with the city of Trenton and has ntly been extended to Monmouth, Warren, and erset Counties.

Georgia's Newsprint Facilities Inspected by Paper Makers

epresentatives of several organizations of technical er manufacturers visited Savannah, Ga., on May 1 2 at the invitation of the Georgia Forestry Associa-, which was holding its annual meeting at that time. 75 pulp and paper men joined in several sessions the foresters and inspected pine forests in the nity of Savannah and the Georgia Pulp and Paper oratory, where Dr. Charles H. Herty has conducted experiments in the use of southern pines for making sprint.

ome of the paper manufacturers were disappointed he pine stands because of the scarcity of young trees he proper size for paper making. The prevalence of in Georgia forests has been the cause of great losses oung trees and has in many cases prevented natural restation. It is apparent, however, that the land apable of growing plenty of pulp material if given a nce.

diana Nurseries Have a Busy Season

ndiana's three State forest nurseries were about sold of salable trees during the spring planting season. otal of 1,987,555 trees was distributed and orders eived for 373,800 more could not be filled. Of those tributed, 1,107,970 were conifers and 879,585 were dwoods. Farmers received the largest number, or ,520; coal operators received 582,000; 208,884 were nted on State forests, 389,151 on State parks, and 00 on State game preserves.

In the Clark County State forest nursery 450 seed beds of American red, Virginia, jack, and white pines, and of Norway spruce were prepared this spring. These beds should produce 2,500,000 trees. In addition, approximately 1,450 seed beds of hardwoods were prepared, which should produce 1,700,000 trees. About 1,500,000 trees of the coniferous species were transplanted at the same nursery.

At the Jackson County nursery approximately 1,500,000 trees were transplanted, the stock being obtained from the Clark County nursery. The same number of trees was transplanted in the Shakamak nursery at Jasonville, Ind., making the total number of trees transplanted in the State this spring 4,500,000.

Spring Planting in Pennsylvania

Charles R. Meek, chief of the bureau of forest extension of the Pennsylvania Department of Forests and Waters, reports that 1,926 shipments were made from the four State forest nurseries in Pennsylvania during the spring planting season of 1933. Approximately 6,750,000 seedlings and transplants were included in these shipments. The number of trees planted in the State in 1933 will probably total about half a million less than last spring.

State forest planting this year amounted to 1,450,000 trees, the largest number set out in any one year since 1919. More than 600,000 trees were planted on lands owned by the State but not in State forests. The largest individual planting was at the Pymatuning Reservoir in Crawford County where 326,500 trees were set out. The largest individual State forest planting project was carried on in the Moshannon State Forest in Centre and Clearfield Counties, where 645,000 trees were planted.

Proposed Minnesota Amendment Would Authorize Land Exchanges

An amendment to the State constitution of Minnesota was proposed at the last session of the legislature which would allow the State to exchange State lands "for lands of the United States and other privately owned lands as the legislature may provide". This amendment will come up for vote at the general election in 1934. It is nearly identical with one which was voted on and defeated at the 1932 general election, the addition of the words "and other privately owned lands" being the only change.

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Of $14,000 received by the division of lands and forests of the New York State Conservation Department for relief work, $3,500 is to be spent in employing men to fight the gypsy moth invasion that continues to threaten the wooded areas of eastern New York.

Planting Scrub Oak Areas in Pennsylvania

Successful reforestation of scrub oak lands costs about twice as much as planting on open fields, but the resulting stands should be more nearly normal in rooting and development, writes George S. Perry in the Service Letter of the Pennsylvania Department of Forests and Waters. He describes experimental plantings of 11 species made on scrub oak areas on Kettle Springs Flat and Snowy Mountain in the Mont Alto State Forest, Franklin County, Pa., most of the trees having been planted in the spring of 1930.

The experiments showed that there is an optimum age or size for each species. Three-year-old stock of Scotch pine was the best. Surprisingly, Norway pine transplants were inferior to the less expensive seedlings. However, the unusually dry summer of 1930 may have affected the results.

The most promising method of planting was the gridiron system, with straight parallel lines brushed out across the planting area at intervals of 25 feet. Trees of rapid growth and strong light demands, such as Scotch pine, pitch pine, or larch, were set alternately along these rows, averaging about 25 per 100 feet of line, and located where digging was easiest, between the scrub oak stumps, and outside the crown spread of any desirable trees occurring naturally and retained in the rows. In the uncut strip of brush between the rows tolerant or semitolerant trees, such as white pine, Norway pine, and Norway spruce, were set. The trees planted in the open rows will need one or two careful assistance cuttings.

In planting scrub oak areas, large and well-rooted nursery stock should be used under all conditions. Trees planted with a mattock in the ordinary way showed up as well as those set with a dibble or spade, though possibly the growth of later years may show that the latter have better-developed root systems.

Chinese pine (*Pinus sinensis*) and sawara cedar (*Chamaecyparis pisifera*) were among the most successfull trees used in this work. They both yield excellent wood, and the seeds of Chinese pine being edible and highly nutritious would add a valuable food for forest wild life. In Japan, where it is native, sawara cedar grows to a height of 100 feet and forms dense forests.

* * *

Twenty-three thousand trees were sold from the West Virginia State forest nursery at Lesage, Cabell County, this year, reports the State forester. Many of them were ordered by coal and lumber companies in various sections of the State. The trees furnished included red pine, Norway spruce, white spruce, and black walnut. It is planned to add to the supply of hardwoods for distribution next year black cherry, yellow poplar, and possibly sugar maple.

State Foresters to Meet in Indiana

Indiana has been selected by the board of director the Association of State Foresters as the State wh the 1933 annual meeting of the association will be he according to word received by R. F. Wilcox, India State Forester, from William G. Howard, super tendent of forests and parks of New York and preside of the association.

A 3-day itinerary will be prepared which will inclu visits to the State forests, parks, and game preserves Indiana. The exact dates have not yet been a nounced, but the meeting will probably take pla early in October.

* * *

The New York State Conservation Departme cooperating with the United States Geological Surv has established two stream gauging stations, one Chenango County and the other in Cortland Count for the purpose of determining the effect of refores tion upon the amount of stream flow. A considera area in these two counties was planted by the State 1932. During the early years of the growth of the forests, the streams may be regarded as flowing throu unforested land, but as the trees grow the effect o stream flow should become discernable.

* * *

Three new 80-foot forest-fire observation towers ha been ordered by George H. Wirt, chief forest fi warden of the Pennsylvania Department of Forests an Waters. One of these will be erected on Tussey Mou tain, Huntingdon County, in the Logan State For District; another on Bald Mountain, Carbon Count in the Weiser State Forest District; and the third ne McCord, Centre County, in the Moshannon Stat Forest District. A 60-foot tower now standing o Bald Knob, Huntingdon County, is to be moved to site near Tyrone and increased to 80 feet in height.

* * *

A new pamphlet describing the 14 Wisconsin Stat parks has just been published and copies may be secur from the Wisconsin Conservation Department a Madison. Since the last Wisconsin park pamphle was issued 4 of the then State parks have been desig nated as State forests, and one new park, Merrick, o the Mississippi River near Fountain City, has been created.

* * *

The forestry division of the Louisiana Department o Conservation has established an educational section the function of which is to promote in the schools the realization of the necessity for forest-fire protection and the benefits of growing timber crops.

Montana Again Appoints Volunteer Wardens

The appointment in 1932 of 1,500 citizens of Montana volunteer forest-fire wardens having been successful elping to reduce the number of man-caused fires dur- the year, 2,000 such appointments are being made s summer. The notable decrease in this class of fires in 1932 in comparison with the two preceding years is attributed by Rutledge Parker, State forester of Montana, largely to the efforts of the modern "vigilantes."

Each volunteer warden receives an appointment card which authorizes him to make arrests of persons found violating the State fire and forest laws, including careless campers and smokers as well as incendiaries. The appointees serve without pay.

Education and Extension

Development of Wood Crafts in West Virginia

n his annual report for 1932, T. W. Skuce, Exten- n Forester of West Virginia, tells of efforts to develop rces of income on West Virginia farms to supple- nt the diminishing returns from the usual crops. e West Virginia farm woodland has been an impor- t source of cash, but at present there is practically market there for local timber. To overcome this dicap and to aid in making the farm woods pay, extension forester and the county agents have ouraged the development of such home industries the making of furniture, baskets, chairs, handles,

ne man in Randolph County, using red cedar wood ch had been cut out during a campaign against ar rust of apples, made chests trimmed with curly that sold for $25 to $50 each. He sold 65 during year, and his success has encouraged his neighbors plan the production of other wooden articles, such hairs, stands, and tables.

nother farmer of Randolph County developed such lity in the reproduction of antiques that he sold 0 worth at the Mountain State Forest Festival at ins in 1932. In addition he received orders for re than $1,525 worth of his products, including 275 in one order. His raw material comes from his n farm woods.

n another county—Upshur—chestnut had been ng into car-door boards, crossties, and mine timbers. e farmers of Adrian, French Creek, and Rock Cave e shown that more money could be made by using ir wood for fencing material for estates. Following s advice, they shipped during the year 20 cars of ping, garden, sheep, and stock fencing through perative effort.

nother use for chestnut was opened up in the making amp buildings. These were so built that they could moved by truck and be easily set up. With bunks, lving, cupboards, table, and benches all provided, prices of these ran from $128 to $640. They were played at the Mountain State Forest Festival and a 4-H camp at Jackson's Mill with the result that 20 were sold and 27 prospects were listed for future contact.

The project of converting miners into woodworkers was undertaken in Monongalia County to aid in relief work. Under the direction of a farmer with experience in the work, 250 miners have learned to handle tools and turn out very good articles and furniture. Difficulties in obtaining tools were overcome by making them, nearby farmers supplying the wood needed and the metal being obtained around the mines. More than $6,000 worth of business has been done by these miner-woodworkers, and the Mountaineer Craftsmen's Cooperative Association has been organized to facilitate marketing.

To stimulate the production and appreciation of home-grown forest products among the boys of the 4-H clubs, assistance was given in the development of a handicraft project. Some exceptionally fine work was exhibited last summer by a number of the boys, who had started shops at home for the production of attractive articles for sale to the public. In Berkeley County, through the 4-H clubs, the cash income of farmers was increased by the production of wooden toys, the cutting of split wood for rebottoming chairs, and the making of chairs themselves. The latter activity alone brought in more than $500.

Practical Courses Offered at the Idaho Forest School

Courses in tractor operation and blasting were offered to students of logging engineering at the Idaho School of Forestry this year.

The tractor course was instituted in the spring of 1932 and was repeated in 1933 with added attention given to theory. A tractor company furnished the necessary equipment and the department of agricultural engineering of the University of Idaho cooperated in the instruction. During the winter a "tractor short course" was given to afford the forestry students an opportunity to obtain preliminary experience in actual operation of a tractor. The students accomplished some practical results in the course of their practice, and an effort is being made to obtain the necessary road- and trail-building machinery to improve and make more accessible the school forest on Moscow Mountain through the work of the class.

In order to give Idaho forestry students first-hand information in the use of explosives in forest work, a series of lectures terminating with a practical field demonstration was conducted in April for logging engineering students. Demonstrations were given in blasting stumps for rights-of-way, blasting rocks for forest roads and trails, and removing standing trees and snags. This course, too, lends itself to practical ends, and it is planned hereafter to conduct the field work on the school forest where stumps, trees, and projecting rocks can be removed from road locations.

Timber Estimating Project for Virginia 4-H Clubs

Virginia 4-H forestry club members who have completed a forest improvement project are eligible to enter a timber estimating project. Boys undertaking this work will learn: (1) To figure the board-foot contents of lumber and other sawed products; (2) to determine the amount of lumber that can be cut from saw logs (scaling); (3) to estimate the board-foot contents of standing trees (estimating); and (4) to determine the amount of merchantable timber on a given area (cruising).

The average farm in Virginia, as elsewhere, has need for considerable quantities of lumber, and also has timberland from which the farmer may wish to sell material from time to time. This project will familiarize the farm boy with the unit of measure used in buying or selling lumber, logs, and standing trees, and will teach him how to use it.

Interest in Tree Planting Increases in West Virginia County

Farmers and 4-H clubs in Brooke County, W.Va., planted more than 15,000 seedling trees during the month of April. About half of these were used by the 4-H club members in planting small demonstration forests on their own farms. Farmers of the county who have been watching the growth of former 4-H forest plantings of this kind are taking an increasing interest in planting trees on their own lands. The county agent, W. C. Gist, reports that several thousand Norway spruces are being tried in the county for the first time this year, with the idea of using them for Christmas trees.

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Windbreak and other trees on farms have been extensively cut in South Dakota for fuel during the past few years while practically no planting has been done to replace them, reports W. K. Williams, extension forester of the Office of Cooperative Extension Work. No forestry extension work is being conducted in the State.

More Farm Windbreaks Being Plant in Wisconsin

Farm windbreak planting in Wisconsin exceeded past records during the spring of 1933 when over 2, windbreaks were planted by adults in 39 counties. addition, 250 junior forest rangers used their ann supply of trees for planting as windbreaks instead in woodlots.

In order to promote a better understanding of care necessary to secure a high survival, good grow and most efficient protection when the trees are gro 41 half-day windbreak planting schools were conduc by Extension Forester F. B. Trenk during the win and early spring months in 24 Wisconsin count These schools were attended by 1,558 persons.

Four-year-old transplant stock was furnished f of charge by the Conservation Department for th demonstrations. Approximately 275,000 trees w used.

Pines Planted in Nebraska in Erosion Control Project

Farmers in two western Nebraska counties—Mor and Scotts Bluff—early in June completed the plant of 60,000 pine trees in soil-erosion control demonst tions directed by local county farm bureaus with aid of Clayton W. Watkins, extension forester at Nebraska College of Agriculture. The Burlingt Railroad and local civic organizations and relief ag cies also assisted in the project.

Wind erosion is so bad in this part of Nebraska t many farm fences are annually buried by the wi blown soil. The farmers on whose lands the planti was done dread the job of digging out their fen each spring and hope that the trees will help prot their land.

◆

"Woodchopping socials", conducted along the li of the traditional husking bee, have become popular Caswell County, N.C., since one enterprising farn invited the men of his community to assist him cutting firewood from his woodland and to enjoy good dinner. He had attended a timber thinni demonstration given by Extension Forester R. Graeber of North Carolina, and followed forest methods in marking the trees he wanted cut.

◆

A recent summary of the 1930 census reveals that t products of farm woodlands of New York State sold $16,269,000 during that year. There are 3,634,0 acres of such forest land in the State, according J. A. Cope, extension forester. The principal produ is fuelwood, followed in order by saw logs, fence pos poles and piling, railroad ties, and pulpwood.

Kiwanis Club Sponsors 4-H Forestry Work in Oregon City

Under the sponsorship of the Kiwanis Club of Port-nd, Oreg., 4-H forestry clubs of that city are planning acquire a forest for their own use. The tract selected 300 acres of timberland logged in 1925 by the Brix ogging Co., located on the Columbia River about 20 iles from Portland. The company has offered to onate the land to the club, and the transfer will be ade as soon as the title has been cleared.

Plans for the development of the tract include the anting of trees of all kinds, construction of trails and e lines, and the building of a cabin.

Georgia to Hold Third Vocational Forestry Camp

At the Agricultural and Mechanical School at arkesville, Ga., the third annual vocational forestry mp will be held July 24 to August 12. Competitive aminations in forestry are given each spring to stu-nts of about 100 vocational agricultural schools of eorgia. The winners of scholarships as decided by ese examinations are entitled to attend two camp ssions and earn a certificate of vocational forester. ne Georgia State Forest Service has announced that boys have won scholarships this year.

* * *

Nineteen fellowships have been awarded by the New ork State College of Forestry for the year 1933–34; ch scholarship carries a grant of $500. Six of the inners will work for the Ph.D. degree and the other for the master's degree. All recipients of the fellow-ips agree to give instructional assistance or do a nited amount of routine departmental work.

* * *

New laboratories for plant physiology and plant thology were completed last year at Purdue Univer-ty. The laboratories are built around greenhouse nits and over basements equipped for controlled light, mperature, and humidity research.

Connecticut Plans Annual "Forestry Day" Program

July 26, 1933, will be "forestry day" in Connecticut, and a full day's program is being arranged. Meetings will be held at Storrs, the seat of the Connecticut State College. The possibilities of broader use of all classes of native forest products on the average Connecticut farm will be particularly emphasized, according to J. A. Gibbs, extension forester, who is arranging the program.

A State championship chopping contest is a feature of the day, and demonstrations of methods and equipment used in controlling forest and house fires will be given.

* * *

More than 82,000 trees were planted in 17 tree planting demonstrations held in New York State under the direction of George E. Stevens, State supervisor of forestry exhibits, during April and May 1933. School children and Boy Scouts participating in the demonstrations numbered 1,261. At each demonstration Mr. Stevens gave a brief talk on reforestation in New York and then instructed the workers in the actual planting operation.

* * *

Of the 80,000 seedlings planted this spring on Idaho, farms, 56,000 were of black locust, says Stanley C. Clarke, extension forester of Idaho. Other species planted included Siberian elm, white ash, Norway spruce, and Scotch pine. Two hundred to three hundred farmers plant trees on Idaho farms each year on lands unsuitable for agricultural crops.

* * *

The new library in the Marshall Memorial Building of the New York State College of Agriculture, Syracuse, has been dedicated to the late dean of the college, Franklin Moon. It contains 11,000 volumes and 30,000 pamphlets on forestry and kindred subjects, and has up-to-date equipment for the research student.

Forest Service Notes

and Purchases Approved by National Forest Reservation Commission

Acquisition of 433,908.78 acres of forest land by the ederal Government to be brought under the adminis-ation of the Forest Service was approved by the ational Forest Reservation Commission June 9, 1933. he land can be acquired at a total cost of $763,139.99, about $1.72 per acre.

The areas to be bought are all situated within existing national forests and purchase units. Projects of the emergency conservation program will be extended to many of them. The new units are in 16 States: Maine, New Hampshire, Vermont, Pennsylvania, Virginia, West Virginia, Kentucky, Tennessee, North Carolina, Georgia, Florida, Alabama, Arkansas, Michigan, Wisconsin, and Minnesota.

Season of Burning Affects Character of Fire Damage

That fires at different seasons differ in the amount and character of damage they do has long been the contention of various observers. To throw some light on this question an experiment was conducted by the Lake States Forest Experiment Station at the Michigan Forest Fire Experiment Station in which four adjoining plots in an open stand of all-aged jack pine were burned over at various times during 1931 and the resulting damage noted. The conclusions reached may not be applicable to other types, but results of subsequent fire damage studies tend to substantiate them for jack pine. The following table gives percentages of total stand killed, by seasons and size classes:

Season of burning	0- to 1.9-foot height	2- to 6.9-foot height	7-foot height —3.9-inch d.b.h.	4-inch d.b.h. and larger	All sizes
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
Early spring	99	95	26	0	84
Late spring	95	76	5	0	73
Summer	82	88	40	9	68
Fall	64	80	26	0	57
All seasons	86	89	26	2	72

As would be expected, mortality in general was greater in the smaller size classes and progressively less as size increased, regardless of season. In the smaller size classes, however, mortality was highest in spring, while in the larger size classes there was a marked increase in mortality in the summer.

In other words, spring fires in jack pine are particularly destructive of seedlings and saplings but do little damage to merchantable timber, while summer fires are less completely destructive of small trees but do considerable damage to trees in the larger size classes. The reason for this is that although spring fires, as a rule, make a complete burn they are confined to the surface litter and hence are not hot enough to damage seriously the larger trees, though they kill most of the small ones. Summer fires, on the other hand, burn deeper, are hotter, and are more apt to crown, and hence do more damage to large trees. Both summer and fall fires are inclined to be spotty, owing to the presence of green vegetation, and allow a larger proportion of the small trees to escape destruction.

* * *

Tests made recently on the Pike National Forest, Colo., confirm the results of earlier experiments which showed that Douglas fir planting stock can be stored in water for 3 weeks without serious injury and for 2 weeks without any injury whatever. The temperature of the water is apparently the secret of success—ice-cold running water holds the plants in a dormant condition and does not stimulate growth.

"Show Boats" to Visit Camps in Northwest

Two Forest Service trucks, know as "show boat have started on a summer educational campaign show forestry motion pictures and lantern slides at Emergency Conservation camps of Washington Oregon. One truck will cover all the camps in the national forests of Oregon during the summer, hav started June 6 on the Mount Hood Forest. other truck started June 12 on the Columbia Natio Forest, Washington, and will cover camps on th forests in that State.

The Oregon truck has been used in cooperative edu tional work in forestry for 6 years. One of the f such trucks in the United States, it is equipped w electric light plant, motion picture projectors, lant slide machine, screen, and a collection of films slides. The Washington truck is similarly equipp George E. Griffith, of the Regional Office of the For Service, is in charge of the project. Each truck car a crew of two men who show the pictures and g forestry talks.

New Plan for Grazing Fees on Nation Forests Announced

The Forest Service has completed a study to det mine the practicability of relating grazing fees on national forests to the market prices of livesto Recommendations of the Forester have been approv by the Secretary of Agriculture and the followi method of adjusting the grazing fees on national for ranges has been adopted:

(1) The average national forest grazing fees of 1 cents per head per month for cattle and 4.5 cents head per month for sheep in effect during 1931 will used as the basis for making adjustments in the f each year in accordance with fluctuations in livesto prices.

(2) The grazing fees to be paid each year on natio forests will be adjusted so that the fees for any giv year will bear the same ratio to the 1931 rate as ratio which the average prices received by producers the 11 Western States for the year preceding the y for which the fees are to be adjusted bear to correspon ing average prices during the period from 1920 to 19 inclusive, in the case of sheep, and during the peri from 1921 to 1930, inclusive, in the case of cattle.

(3) The cattle fees to be paid each year will be justed on the basis of prices received for beef cattle compiled by the Bureau of Agricultural Economics the sheep fees adjusted on the basis of prices receiv for lambs likewise as compiled by the Bureau of Ag cultural Economics.

(4) In adjusting the grazing fees for 1933 in acco ance with the provisions of the preceding paragrap 4.13 cents will be considered the average price

und of beef cattle for 1932, and 4.18 cents the corre- onding price for lambs; the average fee for 1933 as us determined will be 9.05 cents per head per month r cattle, or 37.6 percent less than the average cattle e determined by appraisal. For sheep the average e in 1933 will be 2.05 cents per head per month, or 54 rcent less than the average sheep fee determined by praisal.

(5) The Forester is authorized to refund any amount llected for the year 1933 in excess of the adjusted fee, to apply any such excess to the payment of any fees e or to be due, and to collect such additional payments may be required to secure full payment of the fees adjusted for the year 1933.

(6) No adjustments in fees shall be made when the plication of the above formula would affect the fees less than one half cent for cattle and one quarter nt for sheep per head per month, and in the establish- ent of all fees they shall be rounded off to the nearest nt for cattle and the nearest quarter cent for sheep r head per month.

(7) The Forester is authorized to make such adjust- ents from time to time as may be necessary to estab- h equitable fees between allotments, forests, regions, States.

This plan will be applied in a broad way with no at- mpt to adjust fees on account of local conditions. To fair to the public and stockmen the method must perate to increase the grazing fees as livestock prices crease. In the event of a decline in livestock prices, cessary reductions in fees will follow.

Forest Service Exhibit at Chicago Small But Effective

By H. R. KYLIE, United States Forest Service

The Forest Service exhibit at the Century of Progress xposition in Chicago presents the nation's forest areas their land-use aspect and illustrates the different for- st values—timber, grazing, recreation, water, and tilization of forest products.

It was necessary to squeeze the exhibit, originally lanned for a space 200 feet long and 50 feet deep into ne 28 feet by 20 feet, and of course many plans had be sacrificed. The smaller exhibit, however, carries ut in a pleasing setting the same ideas originally in- ended for more elaborate exposition.

The background is a large canvas, painted by IacKenzie, showing the topography typical of different arts of the country and depicting areas adapted for razing, timber growing, water development for power nd irrigation, and recreation.

At one end of the canvas a 6-foot Douglas fir tree xtends up to the ceiling, and through an opening in he bark the spectator can see, inside the tree, a minia- ure forest revolving and showing the various phases of anagement on which all forest values depend.

At the other end of the canvas a working model illustrates how the forest takes care of rainfall. Rain falls on two areas, one forested and one denuded. Immediately underneath, a glass section shows how the rainfall acts in finding its way down through the soil to the water table.

Large white-pine trees stand at each side of the exhibit on the aisle and between them a huge Douglas-fir stump, hollowed out into four segments and each lighted at intervals, shows a small part of the research work of the Forest Products Laboratory.

The exhibit is intended to tell visitors, first, that forests must be properly managed and their products efficiently utilized in order to yield their maximum values to the nation, and, second, that forests yield not alone timber but also water, forage, game, and recreation.

New Forestry Films Available and Proposed

Two new forestry films prepared by the Forest Service have been released, and a historical record in motion pictures of the various phases of the work of the Emergency Conservation camps is now in preparation. The two completed films, each 1 reel in length, can now be borrowed from the Office of Motion Pictures of the United States Department of Agriculture for the cost of transportation. They are:

"It Might Have Been You", portraying a disastrous forest fire that destroyed more than 23,000 acres of timber, burned 25 ranch houses, and rendered more than 100 people homeless in a period of 7 hours, all because of the carlessness of a ranch hand, and showing what the Forest Service is doing to prevent such catastrophies.

"The A. B. C. of Forestry", showing the beginnings of forestry—the growth of the tree from the seed; the structure of the tree; the use of water by the tree; effect on the forest of the removal of mature and defective timber. Proper methods of planting and felling trees, the effect of forests on rainfall and erosion and that of fire on the forest, are also shown.

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Recreational facilities of the national forests of California will be improved through emergency conservation projects by the construction and improvement of 2,100 miles of trails, establishment of 725 new public camp grounds, and development of several hundred water systems, according to present plans of the regional forester.

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The Pacific Northwest Forest Experiment Station has moved to new quarters in the New Federal Court House, Main and Sixth Streets, Portland, Oreg.

A Thinning and Pruning Operation in the Appalachians

By Donald Young, United States Forest Service

The Laurel Branch plantation was established in the spring of 1917 on the Nantahala National Forest in Macon County, N.C., on wornout farm land purchased by the Forest Service for $4.25 per acre. Planting was done on 6 acres of impoverished sandy clay loam soil, underlain by granite, which was showing signs of erosion. The site was 3,000 feet above sea level. The cost of planting with 2-1 white pine stock from Cheshire, Conn., spaced 7 by 7 feet, was $8.74 per acre.

In November 1932, the county welfare board allotted money to relieve unemployment in the community in which the plantation was located, to be used in thinning and pruning the plantation. Local citizens out of work were hired at the current rate of $1 per 8-hour day. The money was a part of North Carolina's loan from the Reconstruction Finance Corporation.

Of the original stand of 888 trees per acre 76 percent, or 680, remained after 15 years. During this period, the canopy had completely closed in, limbs were dead 10 feet up the stems and had severe competition for the next 5 feet, and little light and wind reached the forest floor, on which fallen needles formed an undecomposed mat 3 inches deep. Measurements taken on three ¼-acre plots after the thinning showed that the average tree was 4.9 inches in diameter 4½ feet from the ground, 30 feet high, and contained 2.3 cubic feet of wood. For 15-year-old stands of pure white pine at Biltmore the average height is 25 feet and the average diameter 3 inches (U.S. Department of Agriculture Miscellaneous Publication 61). The largest tree was 8 inches in diameter and 45 feet high. The greatest height measured between whorls was 4.2 feet.

The trees to be cut were pointed out to two axmen by the ranger in charge of the work. Only those trees which were completely overtopped and would probably not live much longer and those trees of poor form the terminal shoots of which had been killed were removed. By this method three fourths of an acre per man day was thinned, which meant 111 trees (or 148 trees per acre) cut, leaving 532 per acre.

Since there is a ready market for clear white-pine house logs and rafters in the town of Highlands, N.C., 7 miles from Laurel Branch plantation, at an average price of 50 cents each on the stump, all the trees left after thinning were pruned to a height of at least 15 feet and the taller ones to a height of 20 feet. Straight double-edged pruning saws were used to prune the trees the first 6 feet, or as high as a man can reach with this short saw. One man could low-prune 75 trees per day. Curved single-edged pruning saws with handles 6, 10, and 17 feet long were used to complete the pruning to the desired height, which varied from 15 to 20 feet depending on the total height of the tree and the height of the adjacent limbs partially or completely shading it.
To assure one clear 16-foot log for the final crop all tr
that could be pruned to 17 feet without slowing
growth were so treated. Limbs were undercut to p
vent the bark peeling off and were cut as close to
bole as possible without injuring the bark of the tr
As in low pruning, 75 trees were high-pruned per m
per day.

The costs per acre for treating the area by t
method were $1.33 for thinning, $7.14 for low pruni
(to 6 feet), and $7.14 for high pruning (6 to 20 feet)
total of $15.61. It is expected that in three years t
limb scars will be completely healed and only cle
wood will be grown for the height pruned. Futu
thinning will reduce the number of stems per acre
that the final crop will contain not more than half t
present total. If 200 individuals per acre are remov
by thinnings for house logs within the next 15 yea
$100 per acre may be realized on an outlay of $28.60
the original investment of $12.99 for land and plar
ing plus $15.61 for pruning and thinning after 15 yea
This would still leave more than 300 trees per acre r
maining for the final crop.

The number of stems per acre was reduced approxi
mately one fifth by the thinning operation. Growth
individuals left should increase with reduction in com
petition for moisture, and the soil should be enrich
by the disintegration of the ground cover which su
light and wind can now reach.

Cold Storage of Planting Stock in Bale

By Galen W. Pike, United States Forest Service

On April 8, 1932, 310 bales containing 2,000 to 3,00
ponderosa pine seedlings each, shipped from the Besse
nursery in Nebraska to the Black Hills National Fores
S.Dak., were stored in the egg room of an ice and stora
plant to be kept until they could be planted. Som
bales were removed daily as required on the plantin
project.

The stock was 2-0 ponderosa pine, packed in shing
tow. The bales were piled in tiers four high with tw
2-inch poles between each layer and a 6-inch spac
between tiers. A temperature of 32½° F. was main
tained in the room. To prevent molding in the eg
cases, dry sawdust was kept in the room to absorb an
moisture.

After two weeks some of the bales were gettin
dangerously dry and a few felt warm instead of coo
The bales were immediately transferred to anothe
room where the temperature varied from 33° to 42° F
but where they could be watered. They were a
watered thoroughly and repiled. Watering wa
repeated every 10 days or as often as appeared necesary

The burlap wrappers started to mold after 45 days
but no mold was found on the trees or the shingle tow
probably because of the 1 percent Volck solutio
dipping treatment that had been given at the nurser
before shipping as a sanitation measure to guard agains
the spread of the rust *Peridermium harknessii*. The las

the bales, removed after 52 days in storage, were in rfect condition except that ½- to ¾-inch buds had rted.

It appears from observations of the stock during rage that some arrangement to control humidity as ll as temperature is necessary before planting stock n be successfully held for indefinite periods.

Why Seedlings Are Favored at the Monument Nursery

By W. H. Schrader, United States Forest Service

Because the results of field experiments with Douglas- seedlings favored the use of transplants, the entire tput of this species from the Monument Nursery, ke National Forest, Colo., up to 1922, was transplant ock. In that year root rot made its appearance in the uglas-fir beds. Field experiments began to indicate at Douglas-fir seedling stock was equal and in many stances superior to the best grade of transplants, hough the transplants were stockier and had a much tter root development than the best seedlings.

In our attempts to find out the cause of this change, mples of seedlings and transplants were dissected der the microscope. This revealed that the stringy ots of the seedlings were alive and vital to the tips hile a large percentage of the fine fibrous roots of the ansplants were dead. After these dead portions of e roots were clipped out only a framework of the rger roots remained. Root rot is believed to be the use of this dying back of the finer roots of the trans- ants.

When seedlings are dug up, they suffer a severe eaking and bruising of both lateral and terminal ots. Seedlings planted in the field are put in new il, while those which go into transplant beds are aced in soil with a strong culture of root-rot fungus. his fungus seems to gain entrance at the bruised tips d eats its way through the new root growth. Root- uned seedlings usually show a little indication of this tting near the pruned tips, but it is never very tensive, probably because only the terminal roots are t and the cutting is done deep in the soil.

The use of aluminum sulphate on seed beds will insure healthy growth of roots, but experiments with this emical on transplant beds have been without favor- le results to date.

* * *

The use of airplanes for scouting going fires and for rest patrol following lightning storms and during riods of haze and fog when visibility from ground okouts is poor, will be continued in the California gion of the Forest Service in 1933, contracts for such rvice having been recently awarded.

During the 1932 forest-fire season in California the ing time on emergency fire patrol was 125 hours in rthern California and 88 hours in southern California.

Acorns From the Same Tree Tend to Be Uniform

By O. M. Wood, United States Forest Service

Casual examination of the acorns produced by selected seed trees of chestnut oak (*Quercus montana* Willd.) during five successive years called attention to the distinctive size and shape of the acorns of an individual tree, and suggested a study to confirm this observation.

By establishing a correlation between size and weight of acorns, Korstian, in Factors Controlling Germination and Early Survival in Oaks (Bulletin 19 of the Yale School of Forestry), has shown that weight can be used as a criterion of size. This measure was therefore used to determine the uniformity in size of the acorns produced by a single chestnut oak in southern New Jersey. The tree was 51 years old, 8.8 inches in diameter at breast height, and 40 feet high, with a projected crown area of 650 square feet. In 1932 it produced a total of 556 acorns which were collected in a seed trap. From this lot a 24 percent sample was picked at random and each acorn was weighed. The frequency distribution shown in the table was determined from these weights.

Weight group	Frequency
Grams	*Percent*
3.6– 4.5	0.75
4.6– 5.5	5.22
5.6– 6.5	17.16
6.6– 7.5	30.60
7.6– 8.5	32.84
8.6– 9.5	9.70
9.6–10.5	2.98
10.6–11.5	.75
	100.00

According to this grouping, more than 63 percent of the sample acorns weighed from 6.6 to 8.5 grams and more than 80 percent weighed between 5.6 and 8.5 grams.

No readily applicable criterion exists for measuring the shape of acorns, but from casual observation it is quite apparent that each tree bears acorns of a distinctly uniform shape. A comparison of acorns collected in each of 5 years from one tree indicates that this uniformity persists for that period at least, and may exist throughout the life of the tree.

* * *

Twenty-five surveyors and engineers who will be employed by the Forest Service on emergency conservation work are being taught Forest Service methods of locating truck trails in the mountains of California at a field camp about 12 miles south of Livermore, Calif. C. E. Young and T. E. Davidson of the California Region of the Forest Service are in charge of the camp.

General Forest News

Thick Bark Protects Pine Beetles From Fatal Subzero Temperatures

By F. P. KEEN, United States Bureau of Entomology

That bark beetles are frequently killed by low temperatures has been well established through laboratory experiments and field observations. J. M. Miller, in a series of experiments at the California station of the Division of Forest Insects, Bureau of Entomology, found that overwintering broods of the western pine beetle (*Dendroctonus brevicomis* Lec.) started dying at 0° Fahrenheit and were all killed at 15° below zero. In 1924 and again last winter subzero weather in eastern Oregon and northern California caused widespread mortality among these bark beetles infesting ponderosa pine. As such weather is not uncommon in the pine belt of eastern Oregon, the questions naturally arose, "How is it possible for native pine-beetle broods to escape complete destruction every few years when air temperatures of from 15° to 35° below zero are recorded?" and "To what extent does the bark offer protection?"

To obtain further information on these points, J. A. Beal and W. J. Buckhorn of the Portland (Oreg.) office of the Bureau of Entomology, made a trip to the Ochoco National Forest on February 7, when a period of subzero weather was forecast by the Weather Bureau. Two mercury thermometers were placed beneath the bark of each of six infested ponderosa pine trees of different bark thicknesses—one thermometer on the north and one on the south side. In addition, six minimum thermometers were placed in other beetle-infested trees. Air thermometers were hung close by, and two thermographs were put in operation. Soon after the thermometers were put in place, the air temperature started dropping over a 28-hour period until a low point of 26° below zero was reached. Readings on all mercury thermometers were taken at hourly intervals day and night over a 66-hour period and the minimum thermometers were read daily.

The records obtained showed very definite relationships between air and bark temperatures. Temperatures under thin bark responded within an hour to any marked change in air temperature, while in thick bark there was approximately a 2-hour lag. As might have been expected, the bark did not cool so rapidly as air temperature, and the thicker the bark the more slowly did it respond. At the low point of air temperature, 26° below zero, thin bark one-half inch in thickness remained 8° warmer; 1-inch bark was from 18° to 21° warmer; and 2-inch bark stayed 29° warmer, reaching a low of 3° above zero. Thus only in thin and medium thick bark were temperatures reached which are known to be fatal to the beetles.

In bark which reached temperatures of 11°, 14°, a 17° below zero, subsequent examination of the broc showed mortality of 55, 64, and 73 percent, resp tively. Either these temperatures do not give high a percentage of kill in the field as under labo tory conditions, or the Oregon beetles represent hardy strain capable of surviving the cold weat common to their native habitat. If the rate at whi temperature in the thick bark dropped were mai tained with steadily decreasing air temperature, would require an air temperature of 60° below ze to bring all bark down to temperatures complete fatal to all the beetles. Since such low temperatu are never known to occur in the pine belt of easte Oregon, beetles in thick bark are able to survive a perpetuate the species.

However, this study shows the importance of lo temperatures in destroying bark-beetle broods a controlling epidemics and gives a basis upon which judge the effectiveness in causing beetle mortality low air temperatures which may occur in forests i fested by the western pine beetle.

American Beeches Threatened by Diseas

By R. KENT BEATTIE, United States Bureau of Plant Industry

A disease which was probably introduced from E rope is threatening to do to the American beech wh the blight did to the chestnut. More than a third the beech trees of Nova Scotia and many in Ne Brunswick have been killed by this disease, which is th result of a fungus working in partnership with a insect. Recently the fungus, a species of *Nectria*, ha been found killing beech trees at several places Maine, and the insect, the felted beech scale, is alread known to occur in Maine, New Hampshire, an Massachusetts.

Control or eradication measures must await dete mination of the further distribution of this disease.

* * *

The Schlich Memorial Fund, the interest on which awarded each year in rotation to a division of th British Empire or the United States, was allocated 1933 to the Union of South Africa. According to th Director of Forestry of the Union it will be invested give a yearly prize to the best student at one of th two schools of forestry there.

The 1932 prize money, which was received by th United States, through the decision of the Society American Foresters will be used for a medal or certi cate to be awarded periodically for some noteworth achievement for the advancement of forestry in th country.

resent Status of the Dutch Elm Disease

Eradication measures appear to have been success- in wiping out the Dutch elm disease in Cleveland d Cincinnati, Ohio. Although it had been previously und in these localities, scouting failed to discover ther evidences of it there in the season of 1932, cording to R. Kent Beattie, forest pathologist of e Bureau of Plant Industry.

Many specimens from other parts of the United ates have been received and cultured at the Dutch m Disease Laboratory at Wooster, Ohio, so far with gative results, but lack of funds prevents the general d intensive survey of our principal elm States which ould be made to find this serious European disease fore it can establish itself here.

Measuring the Quantity of Water Consumed by Watershed Vegetation

That a gap exists between the quantity of rain falling a given watershed and the total run-off has been own (*1*) but there is little information as to whether is loss is due entirely to evaporation and transpira- on from vegetation or as to the quantity of water tually so lost. Harry F. Blaney, of the United States ıreau of Agricultural Engineering, reports on some periments in measuring this loss conducted by that ureau in southern California, in the Proceedings of e American Society of Civil Engineers, December 32.

In evaluating evapo-transpiration losses of drainage sins, writes Mr. Blaney, it is desirable to divide the atershed into two areas—drained slopes and canyon ttom. Water conservation, so important in southern alifornia, cannot be accomplished by removing brush om drained slopes without incurring danger of damage erosion that would more than offset the value of the ater saved. Reduction of water losses in canyon ttoms is more promising, but it is necessary to know nearly as possible the exact quantity of water lost such areas through vegetative cover. Experiments the Bureau of Agricultural Engineering in Temescal anyon, 4 miles southeast of Corona, Calif., in the ring of 1929 (*2*) showed that for a 30-day period, pril 28 to May 27, inclusive, the total evapo-transpira- on was 12.9 acre-inches per acre. The vegetation in e canyon consisted of willows, tules, and kindred oist-land growths.

In 1931, this investigation was extended to Coldwater anyon, near San Bernardino, Calif., (*3*) and methods ere developed to measure the evaporation and tran- piration losses in canyon bottoms. One of these ethods was to measure losses of stream flow between vo bedrock controls, located about 2,100 feet apart in e canyon. The canyon bottom was 30 to 50 feet ide and the vegetation mostly alders, with some syca- ores, bays, oaks, and herbaceous growth. During the eriod of record there were no visible indications of water reaching the section under study other than that passing the upper control. At each control a low concrete dam was built across the stream channel on a bedrock foundation, and a measuring flume with water-level recorder was placed at one end of each dam for the purpose of measuring the flow of water passing into and out of the experimental section of the canyon between the controls. At first, values for the gauge height for each hour were used in computing the volume of water passing the two controls and the daily loss was obtained by subtracting the volume of water passing the lower control from the volume passing the upper control. In order to eliminate a large part of this laborious process, a flow recorder that solved the flow formula mechanically was attached to the water-stage recorder.

The relative amounts of the indicated losses chargeable separately to evaporation and transpiration are difficult to determine. However, it has been indicated (*4*) that the rate of evaporation is relatively low when the temperature of the water is below that of the overlying air, and since this condition exists in Coldwater Canyon throughout the growing season it may be assumed that evaporation is small and that the loss indicated by the daily drop in stream flow is due principally to transpiration.

From the Coldwater Canyon measurements it is estimated that the consumptive use of water by canyon-bottom vegetation during the 6-month summer season, May to October, was 45 acre-inches per acre of canyon bottom, 238 acre-inches per mile of stream, or a depth of 0.10 inch over the Coldwater watershed per mile of canyon bottom.

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A United States court of appeals decision recently reversed the ruling of the Federal Trade Commission that the name "California white pine" could not be used for ponderosa pine. The commission held that the species was not botanically a true white pine and that the term was confusing to the trade. Twelve California and southern Oregon lumber companies appealed from this decision, maintaining that the species had been designated by the trade name "California white pine" since the beginning of the lumber industry in the region, that the name was not confusing to purchasers, and that the wood of the species is white, of soft texture, and possesses the general characteristics of the soft pine species.

How Timber Is Helping the Southern Farmer

By W. R. Mattoon, United States Forest Service

As a source of cash income, as building material, and as fuel, timber has been playing an important role on the Southern farm during the economic crisis. Timber from farm forests sells as fuel wood, posts, poles, crossties, saw logs, and pulpwood. In the 12 Southern States in 1930, forest products cut and sold from farms ranked fourth among all agricultural crops as a source of income. Only the returns from cotton, tobacco, and potatoes exceeded those from forest products, while those from all truck crops were less. On the basis of cash receipts for sales from farms, according to estimates of the Bureau of Agricultural Economics, forest products ranked second in Alabama, Arkansas, Mississippi, and Virginia; third in Georgia, North Carolina, South Carolina, and Tennessee; and eighth in Florida, Louisiana, and Texas. The total amount received in 1930 from sales of timber in these States and Oklahoma (where receipts from forest products took ninth place) was $82,436,000.

In building construction there has been a return to pioneer methods in the South. Logs, poles, and split shingles (known as "boards") are being extensively used for building homes, barns, curing-houses, and sheds. Chimneys are being made of sticks and mud. Many small utensils and implements are being fashioned out of wood, and timber is being utilized for all kinds of repair work.

In all the Southern States farmers are cutting and using more wood for fuel than they did a few years ago. They are saving money by not buying other forms of fuel, but scarcely realize the value of the wood they burn. The average Southern farm requires 15 cords of wood for fuel yearly. In 1929, as shown in the 1930 census, the farmers in the 12 Southern States cut 16,800,000 cords of fuel wood from their farms. At an estimated value of $4 per cord, this meant a total of $67,200,000. Besides that used on the farm during the past winter another large amount of fuel wood was shipped by rail and truck and sold in the towns and cities. In Texas the continued high price of natural gas resulted in a sweeping return to wood for fuel. According to reports, a full year's supply of wood ready for the furnace was obtained for the courthouse of Winn Parish, La., at the cost of 1 month's gas fuel bill.

In addition to the above benefits, the woods have supplied fertilizer for the farmer's field crops. The litter and humus on the forest floor, with their content of nitrogen, phosphoric acid, and potash, have been taken to enrich agricultural soil or utilized by cutting out the timber and planting other crops on the land. Clearing up of the woods for this purpose has greatly increased since 1929. Some of the timber so cut has been used or sold but unfortunately a good deal has been burned and wasted.

Depletion of timber stands in the South, howe beneficial the use of the wood may be to the farmers present, carries with it a danger. Are all these star restocking naturally? For future rural prosperi stands of trees of all age classes are absolutely necessa It is widely believed in that region that fields "turn out" will quickly come back to pines. This is ofte fallacy. They did reforest well 20 to 40 years a when there were many old "forest" pines whi scattered large quantities of seed from their 100-fo crowns. But today in many places there is adequa reproduction only along margins of fields, while, many areas, widely separated bush-pines or crops weeds and broom sedge are the rule. The situati calls for aggressive action on the part of foresters a forestry agencies in the South to get young trees start on the lands that are being abandoned. Where se trees have not been left, planting will be necessar The rural communities of the region need to be awa ened more fully to the necessity of providing for a futu timber supply.

* * *

Evidence that the forest of Alaska is moving nor was recently presented before the Ecological Socie of America by Prof. Robert F. Griggs of Geor Washington University. Trees less than a hundr years old form a 1- to 3-mile-wide border to the old forest. These younger trees are growing as rapidly any trees of the same species and reproducing free and the forest is steadily expanding toward the nort Botanists in the Scandinavian countries, also, hav reported that the northern forests are advanci farther into the Arctic.

* * *

In order to insure a perpetual supply of pulpwood f its mills, the Southern Kraft Corporation is reforesti with pines and protecting from fire its property 1,000,000 acres of cut-over lands in five Southe States. The annual rate of growth of the trees will determined, and when they reach pulpwood size on the amount of wood that is being replaced by grow will be cut each year. The company's system of fi protection includes lookout towers, fire lanes, telepho lines, improved roads, and the employment of lo patrolmen.

* * *

Examination of plantations established in 1932 the Tioga State Forest, Pa., disclosed the fact th deer had nipped the tops of about 40 percent of t hemlock, 2 percent of the larch, and 2 percent of t Norway pine trees. In another section of the fore deer were reported to have damaged 5 percent of t trees planted last year.

Individual Planting Records Held by New York and Georgia Owners

Nearly 7,000,000 tree seedlings have been planted by) private landowners in the United States since 15. Thomas F. Luther, of Mechanicville, Saratoga unty, N.Y., planted 5,473,600 trees between 1915 l 1932, reforesting about 5,500 acres. Of these es, 2,506,500 were white pine, 961,400 Norway pine, l 53,000 Norway spruce, the remainder being of scellaneous species. Mr. Luther reports average vival of 70 to 80 percent, the most successful species ng Norway pine.

James Fowler, of Soperton, Treutlen County, Ga., gan planting trees on his worn-out and abandoned ton fields in the spring of 1926. He dug up and used eason-old natural stock of slash pine. The success the first plantings and the prospect of developing pentine pine orchards on his poorer land stimulated n to larger operations. Mr. Fowler probably now ds the record as the largest private individual planter the Southern States. To date he has reforested se to 2,000 acres, at an average rate of 750 trees per e, or a total of 1,500,000 trees, practically all of ich are slash pines.

* * *

The greatest difficulty in manufacturing paper pulp m southern pines is not caused by the resin, as was ticipated, but by the great difference between the ing and summer wood, according to W. G. Mac- ughton, research chemist and assistant to Dr. arles H. Herty at the Georgia Pulp and Paper boratory at Savannah, Ga. The two kinds of ers are so different that it is like dealing with two ferent species in one, says Mr. MacNaughton.

* * *

Experiments with calcium chloride as a possible est fire retardant are reported by Paul W. Stickel, of e Northeastern Forest Experiment Station, in the urnal of Forestry for May 1933. Mr. Stickel con- ides that although this chemical may have a limited lue as a preventive of fires because of its ability to rease moisture content and decrease inflammability, e beneficial effect is rapidly destroyed by heavy ecipitation. As an aid in extinguishing fires it is of actically no value because of the slowness with ich it absorbs water under fire conditions.

* * *

The custom of burning chaparral roots for fuel in en fireplaces in the West has declined on account of eir tendency to explode, says Cyril S. Robinson, nior range examiner, Santa Barbara National rest, Calif., quoting the explanation offered by a othill rancher and woodcutter: "When once burnt over and regrowth covers the burnt root crown, a sealed air chamber is often formed. When heated, the air-charged chamber explodes." Mr. Robinson vouches for the explosions, which are sometimes so violent as to blow sparks and ashes all over the room.

* * *

Supervisory personnel to the number of 20,000 is authorized for all Emergency Conservation camps. This includes superintendents, foremen, foresters, engineers, clerks, and blacksmiths. The number of such employees in the camps already established is running between 10 and 15 for each camp, according to the size of the camp and the nature of the projects. At present there are 591 camps on national forests in all parts of the country and 755 on State lands.

* * *

At the 1932 Congress of the International Union of Forest Research Organizations an international system for the classification of forest literature, which had been under preparation for some time, was adopted. The committee for bibliography now includes the following members: Messrs. Troup, Great Britain (chairman); Perrin, France; Weber, Germany; Jedlinski Poland; and Flury, Switzerland.

* * *

Creosoted wooden piling that is protected from rapid circulation of air loses very little of its creosote content over long periods. The buried portions of creosoted piles removed at Old Spanish Fort on Lake Pontchartrain, La., after more than 40 years' service, could not be distinguished from freshly creosoted piles.

* * *

It is reported that the total length of the portable wooden snow fences in use in the United States to prevent snow from drifting on to roads is probably 50,000,000 feet, and that new fence and replacements require 10,000,000 to 15,000,000 board feet of wood annually. The use of such fences is said to be increasing.

* * *

Stockton, Calif., 90 miles from the Pacific Ocean, is being developed as a fresh-water port. Tributary to the city are some of the finest stands of sugar pine and ponderosa pine in the State.

* * *

A Japanese walnut (*Juglans sieboldiana* Max.) in the arboretum of the Pennsylvania Forest Research Institute grew 7.85 feet in 1932. The tree is now 7 years old from the nut. It was 10 feet tall in the spring of 1932, and almost doubled its growth in one season.

Foreign Notes

Protection Forests in Yugoslavia[1]

Of the total forest area of Yogoslavia, 66 percent, or 5 million hectares (12½ million acres), is classified as protection forest. The general forestry law of December 21, 1929, provides for permanent and temporary protection forests. Both kinds are designated by the governor in each province upon application by forestry officials, landowners, or other interested parties, and after examination and hearings by forestry experts. Forests belonging to any class of owner—private, communal, or State—may be declared protection forests.

Permanent protection forests are those which require special treatment for natural reasons, i.e., to protect the soil, prevent torrential run-off, protect water supplies, etc. Restriction on the handling of such forests is in the interest of the owner as well as the general public, consequently the former is not entitled to compensation because of such restrictions. These seldom go beyond the general prohibition of clear cutting or other measures that will result in devastation, although the Government may prescribe special measures for maintaining the protective effect of the forest. All protection forests are required to be managed according to approved working plans.

Temporary protection forests are those which afford protection or benefits outside of their borders, and primarily to other persons than the owners. Such, for instance, are those serving as windbreaks, those protecting highways, railroads, or buildings, and those needed for reasons of national defense. Restrictions on the handling of these forests vary according to circumstances and may go considerably farther than in the case of permanent protection forests, but they are effective only so long as the need for protection exists. The owner is entitled to compensation from those benefiting from the restrictions and may require them to purchase the forest where the restrictions are particularly burdensome.

Land which is not now forested may also be classified as protection forest where suitable for forest growth and where the existence of a forest is desirable for protective reasons. Afforestation of such land may be required, with suitable assistance by the State.

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The Ontario Department of Forestry distributed 13,000,000 trees to farmers of the Province last year, an average of 4,000 trees to each farm resident.

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[1] Based principally on information obtained by Arthur C. Ringland, European forestry specialist of the United States Forest Service, through correspondence with Dr. A. Ugrenovic, professor at the University of Zagreb, Zagreb, Yugoslavia, whose influence is reflected in the forestry laws of that country.

Plant Quarantine Restrictions of Norway Affecting Trees

A summary of plant quarantine restrictions in fo in Norway, published by the United States Bureau Plant Quarantine under date of March 1, 1933, c tains the following orders concerning forest tree speci

Seeds of all species of *Picea* and *Pinus* from fore countries, except those of *Pinus cembra* and *P. sibiri* shall be treated by the customs with a staining so tion before release for importation.

The seeds must be packed in sacks stenciled in "Utenlandsk Frø" (Foreign Seeds) on each side of t sacks * * *.

Before release by the customs, the seeds shall colored in the following manner: At different places the sack small quantities of a solution of eosin (8 gra eosin dissolved in 1 liter of alcohol) shall be inject with a syringe; 155 cc of solution must be used each 10 kilograms of seed.

Until further notice *Graphium ulmi* Schwarz will regarded as a fungus which is dangerous to plan shrubs, or trees.

The importation of plants of any species of the gen *Ulmus* is prohibited.

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British Columbia Seed Used in Englan

Continuing the reforestation operations that ha been carried on in Great Britain since 1921 in an effo to overcome the damage caused by cutting during t war, the Imperial Forestry Commission, London, i ported this year from British Columbia 800 pounds Sitka spruce seed, gathered on Queen Charlotte Island 20 pounds of western hemlock seed, 40 pounds western larch seed, 25 pounds of red alder seed, pounds of white fir seed, 35 pounds of Douglas fir see and 75 pounds of lodgepole pine seed.

This is the first year that alder seed has been amo the species exported. Because of its rapid growth, will be used in planting windbreaks or as cover f coniferous seedlings.

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The tendency of a water-soluble salt used as a pr servative against decay of wooden poles to climb the sapwood to the top of the pole when it is plac in the ground has been the subject of investigation the Forest Products Laboratories of Canada. Resul indicate that poles treated with such water-solub preservatives as zinc chloride are not immune for a indefinite time to fungus attack in the vicinity of t ground line, the most vulnerable point, because of th tendency.

orest Fires and Weather in Japan

In a paper published in Nature (London), T. Terada d T. Utigasaki state that the annual loss due to est fires in Japan is second in magnitude only to at suffered by the United States. The article ntinues:

> Japanese meteorologists might therefore do good vice by studying the weather conditions that precede ese fires in Japan and perhaps eventually organizing system of warnings, following the example of the ited States. The authors of this paper were led to udy this subject with the aid of synoptic weather arts through the known tendency for the fires to eak out practically simultaneously in widely scattered rts of Japan. They conclude that such outbreaks generally associated with the near approach of the quall-line" or principal cold front of a depression lowing an easterly track north of Japan, when the rmer of the two wind currents yields maximum nperatures of 20° C. or more. There seems no propriate reason why the front should have anything do with the matter; it is easy to imagine that the cessary antecedent conditions are merely a sufficiency wind and warmth, with no rain and perhaps some ecial state of the air in regard to its water-vapour ntent. These conditions might seldom occur except the approach of a depression * * *.

A Simple Method of Treating Poles Used in Sweden

A new and simple method for treating poles and posts lengthen their period of service is described in the edish forestry journal "Skogen." It is based on the ility of wood to absorb and conduct through its pores solution of an aseptic or antiseptic nature. In the stance described a sodium fluoride preparation was ed.

Tests were made with pine poles 30 feet long and 7 8 inches in diameter at the base. Each post or pole s set with its base encased in a sheet iron can con-ining about 2½ pounds of the preservative. The wer part of the hole was packed with stones to keep rth from contaminating the contents of the can.

Within a year after the poles were set, the preserva-ve solution had reached a height of 20 feet, and a udy made after 3 years showed that it was effective up to 26 feet. The poles were examined and found to be completely sound and thoroughly impregnated except for a small part of the upper end and the dense, naturally durable heartwood. For this reason it is advised that the tops of posts and poles treated as described should be protected with a cap of zinc or other durable metal and the part above 25 feet given a brush treatment with some liquid preservative.

Producing Japanese Dwarf Trees

The development of dwarf trees as practiced in Japan is the reversal of nature's method, and consists in nurturing the unfittest. The system of culture used is described in Garden Life.

First, a poor, weak seed is chosen for planting. As soon as it has sprouted and attained a little growth the leading shoot is trimmed off. The plant then grows two other shoots. These are carefully watched, and when one exhibits a strength and vitality greater than its fellow it is at once cut off and the weaker shoot left to form the future dwarf tree's main stem or trunk.

This system of trimming and cutting is followed punctiliously; water is seldom used, and only in such small quantities as actually to keep the plant alive; the tree is kept in a pot too small for its full development; and the roots are constantly pruned. The shoots are carefully trained and bent to follow the growth of a large tree. After about 5 years of such training the little tree can be left to itself and trusted not to strike out again in pursuit of its natural size and vigor.

Some of the specimens of Japanese dwarf trees are very beautiful and compare in form, though not in size, with their forest-grown brothers.

* * *

According to figures compiled by the Canadian Forest Service, 30.7 percent of the wood cut annually in Canada is used for fuel. A larger amount, 38.2 percent of the total quantity, goes to the sawmill; pulpwood is the third most important use, 24.2 percent being thus consumed. Railroad ties, fences, poles, and piling require from 5.75 percent of the total to 0.5 percent each.

Personals

Robert Y. Stuart, United States Forester, received e honorary degree of doctor of science from Dickin-n College June 12, 30 years after his graduation in e class of 1903.

John D. Clarke, Representative from New York, s been appointed a member of the National Forest eservation Commission to succeed Representative . C. Hawley, of Oregon. The Commission is now composed of George H. Dern, Secretary of War, Harold L. Ickes, Secretary of the Interior, Henry A. Wallace, Secretary of Agriculture, *ex officio* members; and Senator Henry W. Keyes, of New Hampshire; Senator Walter F. George, of Georgia; Representative Wall Doxey, of Mississippi; and Representative Clarke. Mr. Clarke has shown great interest in forestry and is co-author of several important forestry measures, including the Clarke-McNary Act.

T. S. Goodyear was appointed State supervisor of forestry in Washington on May 1, 1933, to succeed George C. Joy, who resigned on April 1. Mr. Goodyear has been with the State division of forestry since 1917, for the past 8 years serving as assistant State supervisor. He is a graduate of the school of forestry of Washington State College.

A. W. Middleton has been appointed State Forester of Idaho to succeed Ben E. Bush, who had held the office since its creation in 1925. Mr. Middleton attended the Oregon School of Forestry for 1 year, and later graduated from the College of Agriculture of the University of Idaho. He has had practical experience in the United States Forest Service.

John Snow has been appointed State forest supervisor of South Dakota to succeed Theodore Shoemaker, who had held the position since 1918.

W. R. Hine has been designated assistant to Fred Morrell, chief of the branch of public relations of the United States Forest Service, in connection with the emergency conservation work program in the States. Mr. Hine has held the positions of State forester of Louisiana, district inspector of the Gulf States District, United States Forest Service, and executive secretary of the Society of American Foresters.

Alfred A. Doppell, who for the past year has been acting assistant State forester of Maryland, is now employed as assistant to G. T. Backus, district forest inspector of the Middle Atlantic District, in connection with emergency conservation work in that district.

Aldo Leopold has been placed in charge of erosion control in connection with the emergency conservation work program in the Southwestern Region of the United States Forest Service. He will give particular attention to the correlation between erosion control, forest-cultural operations, and game problems. Mr. Leopold was formerly assistant regional forester in that region. In 1924 he transferred to the Forest Products Laboratory, from which he resigned as assistant director in 1929. Since then he has been in charge of a game survey for the Sporting Arms and Ammunition Manufacturers' Institute.

R. S. Maddox, former State forester of Tennessee and more recently assistant forester of Virginia, has accepted appointment in region 7 of the United States Forest Service as staff assistant to the supervisor of the Monongahela National Forest, W.Va., in connection with Emergency Conservation Work.

George H. Cecil, executive secretary of the Los Angeles County Conservation Association, has been appointed special inspector of forestry projects to be carried on in the 57 Emergency Conservation camps to be established in the 4 national forests of southern California.

Emanuel Fritz, associate professor of forestry the University of California, has been elected a me ber of the council of the Save-the-Redwoods League

Hugo Winkenwerder, dean of the college of forest at the University of Washington, has been appoint acting president of the university to take effect on t resignation of the president June 30.

Officers of the Gulf States section of the Society American Foresters for the present year are: G. Lentz, Assistant Regional Forest Survey Director the United States Forest Service, chairman; P. Garrison, forester of the Great Southern Lumber C vice chairman; and Robert Moore, extension forest of Louisiana, secretary-treasurer. The 1933 annu meeting of the section was held jointly with the Ass ciation of Southern Agricultural Workers at Ne Orleans.

The Washington section of the Society of Americ Foresters has reelected J. P. Kinney, director of forest of the Bureau of Indian Aflairs, United States Depar ment of the Interior, chairman for a second year. A. Fivaz, of the Division of Blister Rust Control of t United States Department of Agriculture, was reelect vice chairman, and W. A. Dayton, of the United Stat Forest Service, was elected secretary-treasurer.

James A. Howarth, forest supervisor of the Quinau Indian Reservation at Hoquiam, Wash., for seve years, was transferred June 15 to the Klamath India Agency, Oreg., where he will take the place of Fred Moffat, forest supervisor, who went to Hoquiam on t same date.

The Georgia Forestry Association at its 12th annu meeting reelected all its officers. They are: T. Woolford, president; Ogden Persons, first vice presiden Jack Williams, second vice president; J. Phil Campbel third vice president; Joseph A. McCord, Sr., treasure and Bonnell Stone, secretary. C. B. Harman is chai man of the executive committee. Mr. Woolford ha recently been elected by the United States Chamber Commerce a director of that organization.

The original building of the New York State Colleg of Forestry has been named Bray Hall, in honor William L. Bray, who gave the first forestry courses Syracuse University, was the first head of the college 1911, and has instructed almost continuously in bota ical subjects at the sophomore summer camp of th college on Cranberry Lake. He is now dean of th graduate school of Syracuse University.

Aubrey R. Watzek was reelected president of th Oregon Forest Fire Association at a meeting this sprin Other officers elected are: George B. McLeod, fir vice president; Earl B. Tanner, second vice presiden R. H. Chapler, secretary and manager. Members the board of managers include C. S. Chapman, R. Moore, Earl G. Muir, H. R. Irish, C. L. Starr, R. Fox, E. B. Tanner, J. R. Frum, and Wells Gilbert.

Dow V. Baxter and John Ehrlich have been awarded llowships for the study of forestry abroad by the oard of National Research Fellowships in the Biologi- l Sciences of the National Research Council, which ade 26 reappointments and 41 new appointments for 933–34.

Dr. Baxter received his B.S. degree in forestry in 921, his M.S.F. degree in 1922, and his Ph.D. degree forest pathology in 1924, all from the University Michigan. He has taught botany at the Universities Michigan and Wisconsin, and forestry at the Uni- ersity of Michigan, where he is at present associate rofessor of silvics and forest pathology. He has spent everal summers in field work for the Bureau of Plant ndustry of the United States Department of Agriculture. His fellowship study will take him to Alaska for 3 months, where he will work at the regional headquarters of the United States Forest Service at Juneau; to Stockholm, Sweden, for 3 months; and to Washington, D.C., where he will spend 3 months working with the division of forest pathology of the Bureau of Plant Industry.

John Ehrlich received the degree of B.F. from Cornell University in 1928; that of A.M. from Duke University in 1929; and the M.F. degree from Harvard University in 1930. From 1931 to 1933 he was Anna C. Ames Memorial scholar at Harvard and in 1933 received the Ph.D. degree in forest pathology. His study under the fellowship will be done at the Imperial Mycological Institute at Kew, England.

Bibliography

An Outstanding Book on Game

By C. E. Rachford, United States Forest Service

Mr. Leopold's volume [2] is a monumental work, the rst of its kind. It supplies an urgent national need. The subject is of national importance. Wild game as had the thought and study of naturalists, scientists, portsmen, and land managers for many years. Much as been written, but the literature on game, except in re cases, deals with some particular phase or species. rom this heterogeneous mass of information Mr. eopold has extracted the essentials and combined them ith the results of his own research and observations nto a worth-while and interesting treatise on the subect as a whole. He has cut, spliced, and fitted all of he pieces into a very fine mosaic, which he terms "Game Management." His definition of game managenent as "the art of making land produce sustained nnual crops of wild game for recreational use" indiates his constructive approach to the problem. Mr. eopold's training, his broad knowledge of the subject, nd his inherent love of the soil and of all natural eauty no doubt account largely for the approach.

"Management theory" is the topic discussed in the irst five chapters of the book comprised by part I. These chapters deal with the history of ideas on and the nechanism of game management, properties of game opulations, fluctuation and density, movements, olerances, sex and flock habits, and game range.

The reader will be impressed by the simplicity of xpression and the consummate skill with which somewhat dry historical, statistical, and scientific facts are ssembled and made interesting and usable. Unlike most writers, the author does not bemoan the mistakes of the past nor dwell on the near extinction of wild ife in this country; rather, he proceeds to analyze onditions and factors responsible for them. While ree use is made of what scientific facts are available, their paucity is emphasized. In demonstrating the need for scientific facts and the use to which they may be put, the book renders one of its major contributions. To the individual scientific worker will come a revelation as to just how the results of his work may be fitted into land-use plans. It seems certain that through this book game research will be given a much needed impetus and directed along more productive channels.

While part I gives the essential background of game management, part II deals with the methods by which the biological mechanism is to be controlled. These constitute the technique of game management.

Of particular importance to the work of forest officers are the four consecutive steps outlined for the initiation of game management:

1. Census—measuring the stock on hand.
2. Measuring the productivity of the stock and comparing it with a standard.
3. Diagnosis—weighing the factors and selecting one or more for control; testing these on a small scale to ascertain whether the selection is correct and the method of control effective.
4. Control of selected factors on a large scale.

The most promising methods to be followed in each of the above steps are fully discussed, and while the author recognizes their inadequacy he points out that the interests of wild life do not permit the delay incident to the development of the last word in methods. Rather, he stresses the paramount necessity of using the best tools now at hand.

Part II also deals with diagnosis of productivity, game refuges, control of hunting, predators, food and water, cover, disease, and accidents. It contains discussions of miscellaneous techniques, including artificial propagation, nesting studies, trapping game, game maps, range tallies, and game surveys.

Game economics and aesthetics, policy and administration, and game management as a profession are discussed in part III.

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[2] Leopold, Aldo: Game Management, 481 pp., New York, Charles Scribner's Sons. 1933. $5.

In his discussion of game administration the author points out that basic to an intelligent consideration of the game problem is an understanding that only the landowner can successfully propagate game. It matters not whether it is done individually or collectively, the extent to which the landowner receives some return for his interest and expense determines the extent to which he will keep his land productive. That sounds like one of those truisms or platitudes which Mr. Leopold implies are almost worthless in comparison with the new formula that all species must have the proper environment to insure productiveness. Nevertheless, it is only within the past few years that the general public has begun to accept the premise that the private landowner is entitled to some consideration. "Game Management" should be of great aid to owners of land which is suitable range for one or more species of game, and administrators of public lands, as well as those who manage lands in private ownership, will find how game production may be fitted into other land operations for which they may be responsible.

The present state of game administration is aptly described. Some States have gone through the first step of "policing the remnants of the virgin game crop" and entered the second step of "game farming." Others have taken the third, fourth, and fifth steps of "acquiring State lands and managing them", "starting educational work", and "starting fact-finding work after learning that the requisite facts for steps 2, 3, and 4 do not exist." None has undertaken the sixth step, "starting to encourage private management and regulating private management in the public interest."

On this background, emphasis is laid upon the kind of regulatory machinery and personnel needed. The author is not so greatly concerned over the form of organization; he is more concerned over personnel capable of "building their own house."

In treating game management as a profession, Mr. Leopold calls attention to what has happened in the fields of forestry and agricultural administration and sees the same transition in the field of game. The specified qualifications for the individual and the curricula recommended for schools will be most helpful to students and colleges.

Since so much thought and discussion are now being devoted to "multiple use plans" or "coordinated land-use programs", the book comes at an opportune time for forest officers. It not only provides methods of diagnosis of our game problems, but teaches us how to make better use of accumulated data.

As explained in the preface, this volume aspires to a three-fold function: First, to serve as a text for those practicing game management or studying it as a profession; second, to interpret for the thinking sportsman or nature lover the significance of some of the things that he sees while afield with gun or glass or that he does in his capacity as a voting conservationist; third, to explain to the naturalist, biologist, agricultural expert, and forester how his own science is related to game management and how his practices condition application to the land.

How well and faithfully the volume performs th functions can be appreciated only after it is carefu studied, page by page.

Reclaiming Gullied Lands With Soil-Binding Plants

By W. R. Mattoon, United States Forest Service

Farmers' Bulletin 1697[3] brings out clearly the val of a vegetative cover in checking soil erosion and reg lating stream flow by permitting rapid absorption water from rainfall and by obstructing its quick run- from the surface. Certain plant species have be found to be particularly adapted to soil conservation the Southern States. These natural soil binders i clude black locust, shortleaf pine, and cottonwo trees; honeysuckle and kudzu vines; and Bermu grass and Lespedeza.

The problem of checking gully erosion has a doub phase in that gullies are not only destructive in a of themselves but they are normally a menace adjacent productive land, threatening combined loss in land values often far in excess of the cost of checki and reclaiming them.

The planting of trees and other forms of vegetatio for gully control may well be conducted as an indepen ent enterprise, but usually it goes hand in hand wi the building of a series of low dams in the various par of the gully system or basin to be treated. As co ducted in the silt loam uplands of the Mississip River basin in western Tennessee and northern Mi sissippi, the problem of gully reclamation has thr distinct steps, namely, constructing low brush da at strategic points over the headwaters of the gul system, plowing the gully banks and top for a width 10 to 20 feet back from the edges, and lastly plantin a cover on the caught-up soil above the dams and th sides and tops of the gully banks.

The work of building dams and plowing the so should be done several months in advance in prepara tion for the planting, for which the late winter and earl spring are generally the most favorable times. Th need for planting natural soil binders in the South greatest on eroded and abandoned farm lands. Th region in greatest need of extensive treatment covers vast area over the lower slopes of the Appalachians an adjoining the piedmont region, extending to the coasta plain, and in the hilly uplands of the central Missis sippi basin.

Recent studies by the Southern Forest Experimen Station show that it is often cheaper to plant the gully ing basin than it is to construct dams or dikes. Th vegetation not only holds the soil but also builds up it fertility, and the trees, especially black locusts, yiel aluable crop of fence posts in 10 to 20 years. Excel- t stands of blue grass are known to have become ablished naturally under the protective shade and the soil enriched by roots of the leguminous black ust trees. This occurrence was observed in the silt m soils of west Tennessee and northern Mississippi, ere, in fact, the studies reported in the bulletin were ost exclusively made.

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[3] Meginnis, H. G.: Using Soil-Binding Plants to Reclaim Gullies i the South, 18 pp., illus. U.S. Department of Agriculture, 1933.

he author includes a reference to the experiments the planting of various grasses conducted by the ssissippi Branch Experiment Station located at lly Springs, Miss. He might very well have made ilar reference to the splendid accomplishment of the nnessee State Department of Forestry[4] in developing method (which might well be named the Tennessee thod) of building brush dams, plowing gully banks, l planting black locust trees.

ince the studies were made almost exclusively in the p silt loam (loess) soil found only over the very tricted area mentioned above, the title of the present letin would seem to be rather too broad, and like- e the findings of the study not sufficiently guarded caution as to their application generally over the ith. For example, we have yet to ascertain the plicability of the various trees and other plants to nting in the sterile, dense, clay subsoils of the vast dmont region.

New Forest Tax Plans Proposed in Report

rogress Report No. 18 of the Forest Taxation uiry of the United States Forest Service[5] is the t published installment of the conclusions reached the Inquiry as the result of a Nation-wide study of est taxation conducted during the past 6 years. is preliminary publication contains that part of the cluding chapter of the full report which deals with inite plans for special tax treatment of forest proper- s. The complete report of the study is now being pared for publication.

he investigations of the Inquiry have made it clear t the tax disabilities suffered by forest lands are nmon to rural real estate in general, and to rural real ate in sparsely settled regions in particular. These abilities go back to broad problems of land use and tlement and governmental organization and cost, l involve questions of assessment practice and other cedures required by the property tax system. But n if these broader questions were disposed of, there inequalities in the tax burden that weigh heavily certain kinds of forest property even under a per- tly administered property tax in a properly organ- d rural community. It is the methods of avoiding se inherent inequalities by specific plans of forest ation that are presented in the present progress port.

Somewhat surprisingly, the Inquiry reports adversely upon the yield tax. This plan, whereby a tax on the yield of forest products when harvested is substituted for the annual property tax upon the value of the trees, has been generally favored and has found its way onto the statute books of a number of States, though so framed as to lead to very slight application. The Inquiry concludes that the yield tax would prove very defective in practice, since there is no way of determining a rate for such a tax that would be equitable to the forest owners and at the same time make the tax bear a proper relation to the property tax paid by other classes of the community. The disturbance of local revenues resulting from application of the yield tax would be very serious unless the plan were accompanied by drastic reorganization or redistribution of the respective functions of State and local governments. The yield tax would be unduly severe upon old-growth forests being at present operated, and it might in time come to place an unduly severe burden upon the majority of the forests.

The plan of exempting all immature timber from the property tax, as is done in California and as was recommended by a committee of the National Tax Association in 1922, is also reported upon adversely. It is shown that except under very special circumstances, which would seldom be found in practice, this plan would give an undue advantage to forest properties.

Two plans are recommended by the Inquiry. One is a device for counteracting those adverse effects of tax payments required in advance of the receipt of income which the property tax imposes upon deferred-income forests, and is called the "adjusted property tax." It would permit a deduction from the assessed value of the timber each year based upon the normal expected increase in the value of the forests. An exception to this would occur in years when the receipt of income cancels the reduction. In other respects the plan retains the form of the property tax and would give the same stability to local revenues.

The other recommended plan is "partial timber exemption." Under it a certain percentage of the value of the timber—at a uniform rate for the whole State as fixed in the law—would be exempt from taxation. This would apply to young-growth forests and, under certain circumstances or with certain limitations, to old-growth forests also. Through it a rough adjustment of the property tax to the special circumstances of forestry would be accomplished with the minimum of change from the present tax system. It is similar to a plan now in use in some of the cantons of Switzerland.

The Inquiry gives no support to a number of devices which have found more or less favor among forest-tax reformers, including fixed assessments of forest properties and a specific tax in lieu of the regular property tax, or to attempts to make forest tax laws rigid and immune from amendment by future legislation through the expedient of making the law a contract between the State and the taxpayer. No faith is placed in any plan of taxation which makes the form or amount of

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Under the direct charge of former State Forester R. S. Maddox.

60 pp., mimeographed, May 1, 1933.

tax depend upon the intention of the owner to practice forestry; the report insists that all tax laws should be of general application and compulsory, without any of the optional features which characterize many existing yield tax laws. Facts, not intentions, are declared to be the proper measure of tax obligation.

A Useful Forestry Text

By W. K. Williams, Extension Forester, Office of Cooperative Extension Work

The University of Michigan has recently issued a publication entitled "Forestry and School Studies," by E. V. Jotter, assistant professor of forest extension of the School of Forestry and Conservation. The bulletin, which carries the subtitle "A Correlation for Elementary Grades", brings together information on the subject of forestry in the form of lessons for teachers and pupils. There are 128 pages; 100 of them are given over to 40 lessons, which means that the average lesson covers 2½ pages. There are 20 lessons under each of two main divisions: an "introductory program" for pupils in the first five grades, and an "advanced program" for pupils in the 6th to 8th grades.

In speaking of the purpose of the publication, the author says: "The bulletin aims to present some of the simpler and more important phases of the subject in such a way that teachers can pass them on to the children through the usual school subjects such as arithmetic, reading, language, drawing, geography, history, and nature study." This method, he believes, "has the advantage of avoiding the introduction of a new course into the curriculum and of correlating forestry with these studies so as to give the pupils a keener appreciation of its broad scope and interrelations."

At the beginning of each lesson is a general discussion which the author intends as a forestry background for the lesson. In correlating the forestry lesson with other studies, such as airthmetic, geography, and English, there are a number of questions and exercises which call for simple investigations or calculations, the making of a map, the reciting of a poem, or the explaining of a simple forestry operation such as the planting of a tree.

As a usable outline of this method of teaching, in which one subject is correlated with others to bring out the practical relation between them, this publication should make the study of forestry interesting to the pupil and should give him some definite ideas of what forestry is. The presentation of the subject-matter is simple, direct, and easily understood, and with proper guidance on the part of the teacher, should open doors to new fields of thought.

Three sections at the end of the book contain "Notes on Forestry Publications"; an appendix which includes a plan for improving rural school grounds and Michigan municipal forest act; and an index.

Some Articles of Interest in Forestry Periodicals

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Revue des Eaux et Forêts, October 1932.—La nouv méthode d'éclaircie appliquée dans la forêt domani de Bellême (Orne), by Leon Pardé, pp. 841–844.

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The third edition of the Forestry Almanac, publish by the American Tree Association, Washington, D. contains 484 pages, 94 pages more than the seco edition, issued in 1929. Information covering whole field of forestry is given in the almanac in su a way that almost any desired fact may be easily foun The price is $2.

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